PHOCÆNA,

OR THE

ANATOMY

OF A

PORPESS,

DISSECTED AT

Gresham Colledge:

WITH A

Præliminary Discourse concerning Anatomy, and a Natural History of ANIMALS.

The World was made to be inhabited by Beasts, but studied and contemplated by Man: 'tis the Debt of our Reason we owe unto God, and the Homage we pay him for not being Beasts.

Religio Medici.

LONDON,
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Jos: Banks

To the HONOURABLE

Sr. Joſeph Williamſon, Kt.

Preſident of the *Royal Society*; and to the Council, and Fellows of the ſaid *Society*.

SIR,

THere is no man that hath the free uſe of his Reaſon and Senſes, with Opportunity, but muſt as naturally fall to Philoſophizing; as a Silk-worm that is full grown, and hath a convenient place, muſt fall to Spinning. But one whom the Royal Society hath ſo far honoured and obliged, as to make him of their Number; how much leſs poſſible is it for him to live a Drone, and not to act his part in ſo induſtrious and noble a Hive? As a Specimen of what I am willing more particularly to apply my ſelf to, I here humbly offer the following Diſcourſe to your acceptance.

And which I alſo do with ſome allowable boldneſs; Becauſe upon a ſubject ſo ſuitable to your Deſign; becauſe, I am ſure, I have at leaſt heartily aimed at my Duty in the management of it: and becauſe it was firſt drawn up, and is now publiſhed, not without your own favourable Aſpect and good liking. And if, upon your review, it ſhall again meet with the ſame, I ſhall not only be buoyed up againſt any ill Reflections that may befall it; but encourag'd to proceed in what I have begun: and to do all that one would do, who aſpires to be in ſome meaſure uſeful, and

Sir,

One of

Your moſt Obedient
Servants,

Edw. Tyſon.

A Preliminary Diſcourſe Concerning ANATOMY AND A NATURAL HISTORY OF ANIMALS.

SInce firſt I applyed my ſelf to *Phyſick*, and had ſpent ſome time in the various ſtudies thereof; though each had its peculiar Charms, which allured and greatly delighted the Mind buſied and imployed therein; yet that of *Anatomy* in a more extraordinary manner affected my Genius. The great and uſeful diſcoveries that of late have been made by it in the *Leſſer* World, have equalled, if not exceeded thoſe done by curious Adventurers and Saylers in the *Greater*. New *Tracts*, new *Lands*, new *Seas* are daily found out, and freſh deſcriptions of unknown Countreys ſtill from both brought in; ſo that we are forced to alter our *Maps*, and make anew the *Geography* of both again. Nor have the diſcoveries of the *Indies* more en-

riched the world of old, than those of *Anatomy* now have improved both *Natural* and *Medical* Science: Nor can I tell how otherwise we can attain to that advice of the Oracle, γνῶθι σεαυτὸν, but by Anatomy. Natures *Synthetic* Method in the composure and structure of Animal Bodies, is best learn't by this *Analytic*; by taking to pieces this *Automaton*, and viewing asunder the several Parts, Wheels and Springs that give it life and motion.

Physick certainly must acknowledge *Anatomy* its best Cynosure; and that Pilot must needs err and wander, who without it, being ignorant of the various Seas and Coasts he sails in, steers all in the dark and at random: or if possibly it happens that sometimes he be cast into the desired Port or Haven; yet he is to be esteemed more fortunate than skilful. The dissection of *Morbid* Bodies affords the best account of *Diseases*; and often indicates the *cure* in others: that of *Sanous*, informs us of the true *texture* and *uses* of the parts. Both have their great advantages, both ought with equal Care and Sollicitousness to be cultivated. But since we must know what is the right, before we can understand the various deviations from that Rule; great and laborious have been the Reserches both of the present and former Ages, for the attaining this: But in nothing have their endeavours been more successful than in making a *comparative* survey. Nature when more shy in one, hath more freely confest and shewn herself in another; and a Fly sometimes hath given greater light towards the true knowledge of the structure and the uses of the Parts in Humane Bodies, than an often repeated dissection of the same might have done. Hence it is that the great Improvers of this Learning have digged so much in these rich Mines, and have brought from thence so vast treasures; though they are still so far from exhausting them, or proclaiming Nature's Penury, that they cannot sufficiently extol her Bounty, or with too passionate a Zeal sollicit a farther prosecution of so great a work; which by their example and success therein,

therein, they have both credited and encouraged. We muſt not therefore think the meaneſt of the Creation vile or uſeleſs, ſince that in them in lively Characters (if we can but read) we may find the knowledge of a Deity and our ſelves. What often our inconſiderate Ignorance diſregards and thinks but deſpicable, were there a juſt ſcrutiny made, it could not but excite our greateſt admiration, and extort a Confeſſion of its admirable contrivance and workmanſhip. In every Animal there is a world of wonders; each is a Microcoſme or a world in it ſelf: And that great Conquerour of the world, who wept that there was but one for his ambitious Rage to ſpoil, at length more nobly had his deſires in theſe, and with greater Glory hath eterniz'd his Name, when after he had ravag'd the Air, Sea and Land, at laſt committed to *Ariſtotle* to write the Hiſtory of his Trophies. The wiſeſt of Kings and Men may be thought to have gained great part of his knowledge from them. Nor ever was there an Age ſo ignorant and Brutiſh, but in ſome meaſure or other hath endeavoured to bequeath to Poſterity their Learning herein. Ours that hath ſo widely extended the *Pomœria* or former Boundaries of all good Learning, and with vaſt labour hath at laſt pulled down thoſe *Herculean* Pillars, that too narrowly confined its Empire; having vindicated its juſt Liberties from the Tyranny of uſurping Authorities, and the Credulous ſlavery to ſome Great Names, does daily bring in its ſtores for the rearing a new and more laſting ſtructure of Natural Hiſtory. For impartially viewing the Buildings of the old, and finding in ſo many Places its foundations ſo weak and infirm, although many of its Materials may ſerve again, yet it has been thought more adviſeable to pull it down and begin a new, than to repair the Ruines of ſo decrepit an Edifice. In ſo great a work many hands are daily imployed, ſome in battering down and removing the Rubbiſh, others in endeavouring to lay a good foundation; ſome dig for new ſtone, others labour in poliſhing it; others in inventing new and more conve-

nient Inſtruments and tools to work with; ſome give their Pains, others their Purſes; all their deſires and good wiſhes to ſo noble a deſign. But ſince it will be ſome time before we can expect ſo vaſt a Pile to be compleated; great care muſt be had, that what is brought in, be preſerved and ſecured either from the Injuries of the weather or times, or danger of being ſquandered away, and that all may be ready at hand when they come to have occaſion of uſing it in raiſing this ſtately fabrick; for the modelling and contriving of which the skilfulleſt Artiſts muſt be conſulted with, though even the meaneſt in ſome things may give in their Informations. I ſhall therefore here propoſe a rude Draught or Sciagraphy of a *Natural Hiſtory of Animals*; ſuch as haſtily occurred to me; not what may be done, or the thing requires, but what haply may afford ſome Hints to others.

In compiling therefore a *Natural Hiſtory of Animals*, I have alwayes thought that Ambition of ſome of writing an *Univerſal*, more Pompous than Inſtructive; for the Method they have uſually taken hath been to rake in all from former Authors, without ſeparating the weeds, or ſifting the chaff from the Grain: By this they have farther propagated many antiquated errors, without adding much new Truths to the ſtock themſelves. But had they taken as much pains and travail in ſearching the *Books of Nature* as they have in thoſe of *former Writers*, and inſtead of giving us an account of Animals of *forrain* Countreys (which they could not obſerve) they had made a curious and ſtrict Inquiry into thoſe of *their own*, their accounts would have been more faithful and welcome, and they have deſerved more for this Particular, than their univerſal Hiſtory.

Νῆπιοι, οὐδ' ἴσασιν ὅσῳ πλέον ἥμισυ παντός.

I could therefore wiſh we had a good Hiſtory of the Animals of our own Countrey, and not like giddy Travellers

vellers ramble abroad to see fine things, and still remain ignorant of what we have at home. This History I could desire likewise might commence from the lowest degree of Animation in *Zoophyta's* or *Plant-animals*; inquiring here into Nature's first Rudiments and obscurer *Vestigia* of forming the Organs of an Amphibious life in them; then gradually ascending by her clew to run through all the various Tribes of *Animals*; carefully observing all along the Harmony she keeps, or the Liberty she takes in the different formation of them, and from the whole to give a general Prospect of her workings.

The various tribes of Animals I may reckon *Insects*, *Reptiles*, *Fishes*, *Birds*, *Quadrupeds*, and the *Intermediate species*; and of these may be given

An Account { *Physiological.* / *Anatomical.* / *Medical.*

The *Physiological Account* may contain

The Names / Synonyma's { of { our own / or / other } Nations both { Antient / and / Modern.

Their general and external descriptions.

Their various species and subdivisions, and Characteristical marks.

The Places they most frequent or are bred in.

The season when, and the time how long they live.

Their way of Living, their Food, *&c.*

Any remarkable Observations relating to their sagacity, *&c.*

The use and Benefit they afford to Man, *&c.*

for { Food, and the best way of ordering them. / Cloathing. / Mechanical uses, *&c.*

The

The Injuries they do, how to be avoided or remedied.
The wayes of taking, preſerving, propagating or deſtroying them.

Former Naturaliſts in their Hiſtories have contented themſelves with more or fewer of theſe Inquiries, in which yet they too too oft miſguide us by their Accounts taken from unfaithful Relators, or the fabulous Records of the Antients; nauſeating and obſcuring the whole by tedious Philological Harangues, or troubleſome quotations for the confronting or eſtabliſhing the Opinions of ſome; relying on others, when Autopſie, and their own Experience can only inform them; and their Conſcience and eyes may be as a thouſand Witneſſes. I cannot ſee how a Natural Hiſtory of Animals can be writ without *Zootomy*; at beſt their Accounts can be but ſuperficial, and by them we may know a Pig from a Dog, or that this is a Bull, a Bear or Monky; but ſtill remain ignorant of the curious Contrivance and Mechaniſme of Nature within; juſt as if a perſon ſhould think he had ſufficiently deſcribed a Watch, when he had only taken notice of the Caſe, the Studs, the Glaſs, the figures and hand; by this he may know it to be perhaps a Watch, but knows not how it ſo exactly meaſures time. This moſt neceſſary part therefore and moſt inſtructive,

The *Anatomical Account* may contain,

1. An accurate Diſſection and Deſcription of all the *ſolid* Parts, to be illuſtrated (where neceſſary) with Figures; and herein to be mentioned not only their Site, Number, Figure, Colour, Magnitude, their Cavities, Veſſels, Integuments, Subſtances, Ligaments, and Communications they have with other Parts, but likewiſe in ſome, a more ſtrict ſcrutiny may be made into their utmoſt Textures, by unravelling the ſame, and by the aſſiſtances of Glaſſes and other Methods. Thus viewing Nature where ſhe more plainly diſcovers herſelf, by the Logick of a fair Analogy we may conclude ſhe works the ſame, where yet her

her tracts are more obſcure, and ſhuns the view of our moſt ſollicitous Inquiry.

2. But ſince life and the whole *Oeconomia Animalis* conſiſts chiefly in the *fluider* Parts of our Bodies; I have alwayes thought it a too narrow confinement of Anatomy, when reſtrained only to the ſearch of the *Containing* Parts. The *Contained* likewiſe and *Fluids* are capable of an *Analyſis*, if not by the knife, yet fire: and the various mixtures made of them with *Acids* and *Alkali's* of various ſorts and conſiſtences; and obſerving thence the various Reſults of *Fermentations*, *Ebullitions*, *Coagulations*, alterations in *Colours*, and other Qualities, will afford abundance of curious and inſtructive ſpeculations: and I would have not only a view to be made of all the Humours in each ſingle ſubject, but upon the whole a Reflection to be made; and from ſuch a ſtock of Experiments, we may warrant an Inference, and be more happy in our gueſſes about the uſes of the Parts, and the Offices they perform in this Oeconomy.

3. The *Pſychologia* likewiſe will here deſerve to be conſidered. Senſation and Motion, and what other functions there are of the ſoul, by ſuch a Comparative ſurvey may be rendered more intelligible; and from a clearer knowledge of them in Brutes, at length we may come the better to know our ſelves.

4. Laſtly, *Embryotomia* and the Hiſtory of *Generation*. Theſe as they will require a great deal of Labour in the Reſerch, ſo will they abundantly recompence the Pains by the great plenty they will afford of fruitful Obſervations. Nature viewed in her naked form, in the firſt organization of Animal Bodies, before ſhe hath drawn over the veil of fleſh, and obſcured her firſt lines by the ſucceeding varniſh of her laſt hand, more freely diſplays herſelf, and ſuffers us to behold the disjoynted Parts of this admirable Machine, and how it is that in time ſhe puts them all together: this certainly will be of the greateſt conſequence both for the knowing the ſtructure and the uſes of the Parts.

Part.

But that we may yet reap farther advantage from this diſquiſition, and render it ſerviceable for the Prolongation of Humane, as well as their own lives, I have added

The *Medical Account*, which may contain as well the Diſeaſes they are moſt obnoxious to, with the Hiſtory of Cures performed either by themſelves, or the aſſiſtance of Others; as alſo the *Copia* of Medicines that may be thence obtained, for the enriching and inlarging Pharmacy.

Phyſick, if we may believe the Antients, in its Infancy, took its Riſe from Bruits; they taught us the uſe of Clyſters, Bleeding, Purging, Vomiting, the Soveraign vertues of Plants againſt Poyſons, Hæmorrhagies, Wounds, Blindneſs, and almoſt the whole ſtock of all *Pandora*'s Evils. And certainly were we but diligent in obſerving, our Reaſon might here learn a great deal, which Provident Nature hath taught them by Inſtinct to outdo us in.

Experience tells us, ſome Diſtempers ſometimes are more happily cured in them, than in Men. Phyſick at firſt was but Empiricy; ſucceſs in one, encourag'd a tryal in another. I could therefore wiſh we had an Hiſtory of Cures performed on Brutes. The Antient Phyſicians thought this ſtudy not below them; hence 'tis we have the *Medicina Veterinaria*, *Mulo-Medicina*, *Hippiatria*, Ἱππιατρεῖον, Ὀρνεοτρόφιον, Κυνοτρόφιον, *&c.* By this we may not only preſerve their Lives for our Profits or Pleaſure; but likewiſe be provided with further means of prolonging and lengthening our own.

Likewiſe on theſe Subjects when diſeaſed, variety of Experiments may be tryed for the proof of the force of Medicines, for conquering the moſt ſtubborn diſtempers; the cauſes of their ailements may be enquired into by Anatomy, and more daring attempts offered at, which at length by repeated ſucceſs in them, may be eſſayed in Man. In ſhort, there is no part of Phyſick but what may receive Improvements from them, there being not that difference between our Bodies and theirs, only our Intemperance

perance hath made us liable to a greater number of diſeaſes.

As already they have furniſhed us with a great ſtore of generous Medicines; ſo I doubt not, but that if a ſtrict ſearch were made, we might eaſily augment the ſtock from them. I could therefore wiſh, that this likewiſe were proſecuted, and the beſt Methods of preparing and giving them were faithfully recorded.

Having run through theſe three Accounts, the *Phyſiological*, the *Anatomical* and *Medical*, a reflection upon the whole may be made; and the *Pſeudodoxia* or falſe Opinions of the Antients, and the *fabulous traditions* concerning them, may be taken notice of, rather by way of Catalogue than a larger Confutation.

But here it may be objected perhaps by ſome, That this deſign is too great to be effected, ſince a ſingle ſubject ſo to be examined, will make a volume, and require ſome years, and the aſſiſtances of ſeveral heads and hands. But however ſlothful Ignorance may hence take a diſcouragement, yet nothing is inſuperable to diligence and pains. But he certainly is to blame, who becauſe he can't have all, grows ſullen, and will have none. If what may, were but performed, ſuch a ſtock would eaſily be added to by future diligence; and far better a little with accurateneſs, than an heap of rubbiſh careleſly thrown together. *Malpighi* in his Silk-worm hath done more, than *Jonſton* in his whole book of Inſects; and he and the Ingenious Dr. *Grew* have taught us far more of Plants, than either *Gerard* or *Parkinſon*. Since therefore it requires ſo much Pains, Expence and Time, many hands muſt be engaged therein; although it were to be deſired, that ſome whoſe great Labours and Experience had rendred them more capable and expert, were more immediately concerned. Nor were it difficult, were there more *Alexanders* to find out *Ariſtotles*.

All Animals are not capable of all these heads of Inquiry, and several are so near a kin, that having fully described a *Genus*, the accidental differences of its various *species* would be soon absolved; nor would there need a Repetition, but a bare Recital of the most remarkable discrepances; as the Anatomy of a *Porpess* might indifferently serve for a *Dolphin*, and most of the *Cetaceous* kind. I could therefore wish that at least for the present we had an Account of the most *Anomalous* and *Heteroclite* sorts of Animals; or such whose *species* are most different. These Essays as they would animate Others to the Prosecution of the same, so likewise they would be a great help and assistance to them in the design. Something this way I may do perhaps my self; and though I may not be so able or skilful as to hit the mark, or to catch the Game; yet having raised it, and given the alarm to others, they may more successfully persue it.

What is here performed in the Anatomy of a *Porpess*; since 'tis but from a single Observation, and the first of the kind I had opportunity of dissecting, I cannot think it so exact or full, but that another or my self upon a review, might meet with mistakes, or make additions thereto. Which is but what I have here done to those Accounts given us already of the Anatomy of this Fish, by the famous *Rondeletius*, *Bartholine*, *Jo. Dan. Major*, and Mr. *Ray*. However had it not met with more favourable Censures than my own, it might have still enjoyed, what it best deserves, the silent confinement of my Study. But since it creeps abroad, I must here acknowledge the kindness of my most Ingenious Friend Mr. *Hook*, and those worthy Persons, who gave me the opportunity of making the Observation; And his particular assisting me in design-

ing

ing several of the figures, and other favours deserve my best Remembrance.

I shall only farther add, that we may here take notice of something of Nature's working, and gradual formation of the different Species of Animals; who like a curious Artist in designing the richest Tapistry, does not hastily pass from one extreme Colour to another; but curiously shadowing and intermixing the same, does give a greater Grace and Beauty to the whole. This is but what hath been formerly observed by that antient Christian Philosopher *Nemesius* in his περὶ φύσεως Ἀνθρώπου (p. m. 7.) where he tells us, ὁ δὲ δημιουργὸς ἐκ τοῦ κρείττονος ἔοικεν ἐποιήσατο ἀλλήλαις τὰς διαφόρους φύσεις, ὥστε μίαν εἶναι καὶ συνεχῆ πως πᾶσαν κλίμακα. Several instances he gives of this *amphibious* or Hermophroditical Nature of Animals and Natural Bodies; or as it were a scale or Gradation of them; as first in *Zoophyta's*, then in the Testaceous Kind and Worms, then in more complete Brutes; after in such whose sagacity approaches the confines of Reason; at last in Man and Intelligent Beings, that are a boundary between Divinity and the Creation. What we have here is a signal Example of the same between Land-Quadrupeds and Fishes; for if we view a *Porpess* on the outside, there is nothing more than a fish; if we look within, there is nothing less. It cannot abide upon the Land so much as the *Phoca*, yet is often drowned in its own Element, and hath a constant need of the reciprocal motion of Air in Respiration. It is viviparous, does give suck, and hath all its Organs so contrived according to the standard of them in Land-Quadrupeds; that one would almost think it to be such, but that it lives in the Sea, and hath but two fore-fins. The Contrivance and Structure of several of its parts are most curious and admirable; much illustrating divers late Inventions

of ſome, and affording good hints for making others. And certainly by carefully peruſing theſe Books of Nature, we ſhall not ſquander away our time in trifles, but may expect to meet with what will both pleaſe and raviſh the Phancy, inform the Judgement and enrich the mind with the knowledge of God in his works, and of our ſelves.

ERRATA.

PAge 20. line 1. r. *roundiſh:* p. 21. l. 17. *Phia* r. *Plicæ:* p. 24. l. 14. after *it*, inſert *pallidius:* p. 42. l. 24. after *Tympanum*, add, *had a ſmall bone that did ariſe upwards; but part of it was broken off. We could not obſerve here either* Incus, Stapes, *or* Malleolus, *but to the* Tympanum——

FINIS.

PHOCÆNA,

OR THE

ANATOMY

OF A

PORPESS.

THis Fish by *Aristotle* is call'd *Phocæna*; by *Pliny*, and divers others *Tursio*; in English a *Porpess*, *quasi Porcus Piscis*, or Sea-hog; by the Germans *Marsovin*; in Latin often *Marsuinus*, i.e. *Maris Sus*; and in *Athenæus*, ποτάμιος χοῖρος, and indeed in several particulars it so much resembles that terrestrial Animal, that this Name seems not improper, but much more justifiable than those of divers other Fishes taken from land Creatures.

'Tis placed generally by *Ichthyographers* amongst the Cetaceous kind, and reckoned a Species of Dolphins. (a) *Bellonius* gives several particulars both in the Internal and External parts, wherein the Dolphin and Porpess dif-

(a) *P. Bellon. de Aquatil. l. 1. p. m. 12.*

fer

ſer; but very much ſuſpecting the truth of his Obſervations, I ſhall only take notice of one, mentioned by *Rondeletius*, *Ariſtotle* and *Bellonius* himſelf which is the *Roſtrum* or Snout, which is much longer in the Dolphin than the Porpeſs, which is ſufficient to diſtinguiſh them: and (*b*) *Ulyſſes Aldrovandus* does ſeem to make it the only diſtinction where he ſaith, *Quacunq; etiam de Delphini utroq; ſexu ſcripta ſunt, Phocænæ ſimiliter conveniunt; & niſi Phocæna roſtrum brevius haberet, Delphino fere undiquaq; ſimilis foret.*

The * *figure* of this Porpeſs we diſſected was oblong, its body roundiſh, its Head and *Roſtrum* obtuſe, the *Rictus* of its Mouth but ſmall; it had two finns on the ſides of its breaſt, one on its Back, and a ſemilunary tayle placed parallel to the *Horizon*, which in moſt other fiſhes but of this kind is vertical. The Aperture of its Eyes was but ſmall. On the Head a little above the Eyes, it had a *fiſtula* or Spout ariſing from the Palate, which ſerves him for the drawing in Air for Reſpiration; as alſo for ſpouting out of water, as in the Cetaceous kind. On the Belly we obſerved the Place of the *Umbilicus*, and below that the † *Pudendum*, of each ſide of which were placed two * Teats; below the *Pudendum* was the *Anus*.

* Vid. *Tab.* 1. *Fig.* 1.

† *Tab.* 1. *Fig.* 1. *bb.*
* *Ibid. a.*

The *Dimenſions* of its Body taken in the Decimal Meaſure of an Inch were as follows. From the tip of the Noſe to the Extream of the Tayle was 412 decimals. Its greateſt thickneſs, being at ⅓ from its Noſe, was 82. The Girt of him in its biggeſt part was 250. At the beginning of its fins 230.

From the tip of the Noſe to its Navel 180. to its *Anus* 300. to the Fin on the back 190. to the Fins on the breaſt 100. to the middle of the Spout 52. to its Eye 49.

The length or Aperture of its Eye 7. the diſtance

(b) *Ulyſſ. Aldrovand. de Cetis, p. m.* 119.

between

between the two Eyes in a ſtraight line 52. from the hinder *Canthus* of the Eye to the *Porus Auditorius* was 17.

The length of the Mouth 30. the length of the outward *Rima* of the *Pudendum* 30. the length of thoſe ſlits that were of each ſide, occaſioned by the retraction of the teats, 7.

The length of the Fin of the back 40. the height of the ſame 27. the length of thoſe on the Breaſt 70. the breadth 24. the diſtance betweem them 42. the ſpread of the Tayle 100. the broadeſt part near the Middle 37.

The whole weight of this fiſh was 96 *l. aver du pois*, that diſſected by (c) *Daniel Major* weighed 124 *l.* but (d) *Jonſton* mentions, that in *Neuſtria* there was one taken that weighed 1000 *l.*

The *Colour* of the upper half of the skin, that covered the Back, the Fins and Tayle was of a ſhining black; the reſt very white: but on the ſides a little above the fins, 'twas ſpeckled of an Aſh colour, or as *Major* expreſſeth it, marbled by the mixture of both colours, into ſpots and ſtreaks.

The *Skin* was perfectly ſmooth, without either hair or ſcales, which I ſuppoſe did very much advantage its ſwimming, and may be the reaſon we did not meet with thoſe *foramina* on the head and ſides which are frequent in ſcaly fiſh, and which, as (e) *Steno* hath well obſerved, do diſcharge an oyly ſubſtance, that ſerves for the lubricating the ſides of the fiſh, and ſo renders them fitter for ſwimming; as our Watermen do commonly trim their boats, that they may the more eaſily glide on the water. However on the Noſe of each ſide we obſerved two ſmall holes that would only admit of a briſtle.

(c) *Miſcellan. Curioſa Med. Phyſ. Germanic. anni quarti Obſer.* 20. (d) *Jonſton Hiſt. Nat. de Piſcib. l.* 5. *p. m.* 221. (e) *Nich. Steno de Raia Anat. p. m.* 55. *& Canis Carcharia diſſectum cap. p.* 93.

Beſ-

Bellonius, *Rondeletius*, *Major*, and others do mention the *Meatus Auditorius* which we likewiſe obſerved at that diſtance from the Eye, as hath been expreſſed: 'tis extream ſmall, and whether really perforated at the skin, we ſomewhat doubted; for forcing a ſmall briſtle into it, after it had entered, it readily deſcended towards the *os Petroſum*.

The figure of the Aperture of the * *Spiraculum* or Spout was ſomewhat ſemilunar: 'twas placed acroſs the forehead juſt before the Brain, and was almoſt an Inch in length. * *Tab.* 2. *fig.* 9. *A.*

The ſhape of the *Back* was like the body of a Ship inverted, that were it not for its Fins and Tayle, it would eaſily turn downwards; but the contrivance is moſt convenient for ſwimming, by reaſon the water that is removed in ſwimming is that above them, which does moſt readily give way.

The Horizontal ſite of the *Tayle* in this fiſh is of great uſe. (*f*) Mr. *Ray* conceives it to be *partly* to ſupply the hindermoſt pair of Fins, which ſerve to ballance the body and keep it up in the water, anſwering in proportion to the hinder legs of a Quadruped; Hence we ſee that thoſe fiſhes which have long Bodies, and but one pair of fins, as Eeles and the like, cannot keep themſelves up in water, but lye alwayes grovelling on the bottom: *Partly* to facilitate the fiſhes aſcent to the top of the water (to which he can immediately raiſe himſelf by a light jerk of his tayle thus placed) for the uſe of Reſpiration, which is as neceſſary for him as for Quadrupeds.

The ſtructure of the *viſcera* and inward Parts have ſo great an Analogy and reſemblance to thoſe of Quadrupeds, that we find them here almoſt the ſame. The greateſt difference from them ſeems to be in the external

(f) *Philoſ. Tranſact. n.* 76. *p.* 2275.

ſhape,

ſhape, and wanting feet. But here too we obſerved that when the skin and fleſh was taken off, the † fore-fins did very well repreſent an Arm, there being the *Scapula*, an *os Humeri*, the *Ulna*, and *Radius*, the bones of the *Carpus*, the Metacarp, and 5 *digiti* curiouſly joynted; the Tayle too does very well ſupply the defect of feet both in ſwimming as alſo leaping in the water, as if both hinder-feet were colligated into one, though it conſiſted not of articulated bones but rather Tendons and Cartilages.

† *Tab.* 2. *fig.* 2. & *xi.*

The *Pudendum*, *Anus* and *Mamma* we ſhall deſcribe when we come to thoſe Parts to which they do belong. Next of all we ſhall take notice that the body was divided into three Regions or Venters, the Head, the Breaſt, and Abdomen. All of them had theſe common Integuments, a *Cuticula*, a *Cutis*, Fat, and a *Panniculus Muſculoſus*.

The *Cuticula* was a thin ſcarſe-skin, pretty eaſily ſeparable by ſcraping with a knife from the Cutis. When any part was bent, 'twould wrinkle into exceeding ſmall folds, but when unbent, 'twould readily return to its former ſmoothneſs.

The *Cutis* was $\frac{1}{10}$ of an Inch thick, pretty eaſily vulnerable and flexible. Its Colour was the ſame throughout; but where it was black, there on the innermoſt or concave part it was of the deepeſt colour.

The *Fat*, or as Mr. *Ray* calls it, the *Blubber*, was an Inch, or in ſome places more thick; encompaſſing the whole * body as in an Hog. It had a curious texture of fibres, which ariſing from the *Panniculus Muſculoſus* did decuſſate each other lattice-wiſe, and terminate in the Skin. Examining a ſmall part of this Fat in a good Microſcope, we obſerved it to conſiſt of an admirable ſtructure of numerous ſmall cells or little bladders, in which was contained the Oyl; ſo that upon cutting any part the Oyl would readily run out. The Fat therefore or Blubber in this fiſh was nothing elſe but Oyl contained in thoſe Cells or bladders.

* *Tab.* 1. *fig.* 2. *aaaa.*

There are three uſes Mr. *Ray* aſſigns to this part, 1. To keep the cold water at a diſtance from the bloud, which in this Animal is hot, and by an immediate contact would be apt to be chill'd. 2. To keep in the hot ſteams of the bloud from evaporating. 3. Perhaps alſo to lighten and counterpoiſe the body of the fiſh, which would otherwiſe be too heavy to move and ſwim in the water. *Bartholin* ſaith, that they make uſe of the Oyle for Lamps.

The *Panniculus Carnoſus* here was remarkable, conſiſting of muſcular fibres, which were of a more florid red, than that of the Muſcles. Its fibres from the back ſeemed obliquely aſcending; but from the joyning of the *ſternum* to the *Coſta* and ſo proportionably on the *Abdomen*, deſcending obliquely and meeting at the *Linea alba*. I juſt now mentioned the fibres that did run from the *Panniculus* through the fat to the skin: the uſe of them may be, more firmly to hold to the skin, which if joyned only to the fat, would be much more eaſily ſeparable. They may likewiſe give a Motion to the skin, as the *Panniculus Carnoſus* does in Brutes. And laſtly running through the Fat or blubber, they may very much ſtrengthen the Cells or bladders.

The *Muſcular fleſh* of this Animal reſembled not that of Fiſh, but rather Quadrupeds, being very Sanguineous, but of a dark red Colour. On the *Abdomen* we obſerved the *Muſculi obliquè aſcendentes, obliquè deſcendentes, tranſverſales, & recti.* The tendons of the three former conſtituted the *Linea alba*, which was very broad and of a more curious but looſer texture than uſually: for we could eaſily perceive how they did run in ſeveral *Manipuli*, being interweaved and decuſſating each other as repreſented in *Fig.* 1. *Tab.* 2. The *Muſculi Recti* were very thick and large; on the Inſide we obſerved the *Vena* and *Arteria Mammaria* and *Hypogaſtrica.*

Under the Muſcles of the *Abdomen* lyes the *Peritonæum*, which is a thin though a double Membrane, in the duplicature

* *Tab.* 2. *fig.* 3. *EE.* † *ibid. PP.* ‖ *n n.* * *ib. fff.* † *ff.*

cature of which there lyes the * *Bladder*. Of each ſide the Bladder there are faſtened to the *Peritonæum* the two † *Ovaria* or Teſticles, the Extreams of the ‖ *Cornua Uteri*, as alſo the *Ala Uteri*. The numerous branches of large * blood veſſels that run to them, afforded a very pleaſant ſight. To the Navel were faſtened the *Vena* & † *Arteria Umbilicales*, as in Quadrupeds.

(*g*) *Bartholine* and *Jo. Dan. Major* do both expreſly deny that it hath any *Omentum*; But in that which we diſſected we obſerved a pretty large one; but not extended over the Guts as in other Animals, but drawn up and lying looſe between the Stomach and Inteſtines. 'Twas faſtened to all the Stomachs, and received from them a great number of Sanguinary Veſſels. It had its duplicature as in Quadrupeds, but no fat on it. Its whole texture ſeemed to be nothing elſe but an admirable Schematiſm or Network of Veſſels and Fibres, which our naked Eye as well as Glaſſes could diſcover, and is in part repreſented in *Fig.* 6. *Tab.* 1. (*h*) *Rondeletius* does mention an *Epiploum* in Dolphins, as alſo does (*i*) *Severinus* in his *Phoca*, which he does deſcribe to be without fat, which I rather think is natural, than, as he ſuppoſes, by a contabeſcence.

* *Tab.* 1. *fig.* 6. K.

On the *Omentum* ſeveral Glandulous Bodies are faſtened, * a large round one growing thereon near the firſt ſtomach about the bigneſs of an ordinary Wallnut, being of a dark fleſh Colour, and having a great many veſſels common to it with the ſtomach, which *Bartholine* calls the *vaſa brevia*. At a ſmall diſtance from this are placed ſeveral other leſſer ones, ſome of the bigneſs of an Hazel Nut, others of a Pea or Pepper Corn, in all in number about 10 or 12.

Where Mr. *Ray* does ſay the *Spleen* was ſmall and

(g) *Tho. Bartholin. Hiſtor. Anat. Cent.* 2. *Obſ.* 25. (h) *Rond. de Piſc. l.* 16. *cap.* 8. *p.* 449. (i) *M. A. Severini Phoca illuſtratus. p. m.* 31.

roundiſh; I ſuppoſe he means the largeſt of theſe Globules. *Bartholine* took notice of two as the moſt conſpicuous, and calls them the ſpleen. *Dan. Major* mentions 4 or 5. and ſaith they are ſo like the ſubſtance of the ſpleen, *ut viderentur totidem ſplenes eſſe*; but preſently after adds, *& ipſe Lien quidem peculiaris ac diſtinctus in propria ſede quoque comparuit, ſed ex multis ſimilibus globulis veluti compactus*; if that by this he means any part different from the former globules, his Animal was different from ours, for we could obſerve no ſuch thing. But as the *Kidneys* here conſiſted not of one entire ſubſtance, but of abundance of diſtinct Glands, ſo likewiſe the Spleen which is a conglomerated Glandule, had its various Portions diſtinct and more ſeparated; ſo that as it may be ſaid to have three hundred Kidneys, ſo likewiſe ten or more Spleens. (*k*) *Rondeletius* obſerves that in Dolphins, *Lien in recens natis magnus pro corporis ratione, in adultis parvus & niger.*

Theſe Globules or Spleens were not faſtened, as *Major* hints, to the ſtomach, although placed near it; but to the *Omentum*; as alſo was the † *Pancreas*, which at its *Baſis* was appended likewiſe to the *Duodenum*, where its ‖ *Ductus* entered and emptyed it ſelf a little below the *Pylorus*, and not into the third ſtomach, as Mr. *Ray* aſſerts.

† *Tab.* 1. *Fig.* 6. *H.*

‖ *Ibid. i.*

The Colour of the *Pancreas* was whitiſh, as in other Animals. At its *baſis* 'twas thick, and thinner towards the edges, where it ſeems orbicular or roundiſh. It was about 2 Inches and ½ in diameter. One ſide was flat, the other protuberant. The *ductus Pancreaticus* was pretty large. *Major* ſaith, that the *Pancreas* he obſerved, was *longum valde & exporrectum.* But *Bartholine* deſcribes it to be *triquetrum.*

The *Stomach* in this fiſh was very remarkable, conſiſt-

(k) *Rond. l.* 19. *c.* 8. *p.* 449.

ing

* *Tab.* 1. *Fig.* 6. *A.* † *B.* ‖ *C.* * *D.* † *E E.*

ing of 3 Bags. The * firſt which was the largeſt, was about ten Inches in length, and 3 in breadth, reſembling a long Pouch or Urinal. Towards the upper † part it empties it ſelf into the ſecond ‖ Ventricle which is about 6 inches in length, and 2 and ½ in breadth. This at the * ſide near the *fundus* by a long deſcending narrow paſſage is emptied into the † third, which is about an Inch broad; which ſending one part downwards, is again reflected upwards as repreſented in *Fig.* 6. *Tab.* 1.

The Stomachs are made up of ſeveral *Tunicles*; for in the *firſt*, beſides the *Membrana communis* we eaſily diſcovered a Muſcular Tunicle under it, and in the inſide a ſtrong white Nervous one, which very much reſembled the inward Pellicle of the Gizard of Fowls. It had abundance of ſmall *rugæ* or rather furrows or lines; but at the orifice, where it empties it ſelf into the ſecond ventricle, the *Plicæ* or folds were very large and numerous, that rendered the Paſſage ſo ſtrait, that nothing but a fluid *Chymus* could be tranſmitted.

The inward *Tunicle* of the *ſecond* ſtomach was a pleaſant ſight, having large *rugæ* length-wayes, from the ſides of which at certain ſmall diſtances iſſued mutual Protuberances of the ſame ſubſtance. The Colour of the whole was a florid red, very much reſembling the branches of red Coral. By ſcraping with a knife I could expreſs a great deal of a Chymous ſubſtance out of it, and pretty eaſily ſeparate this tunicle from the next. It was about ⅛ of an Inch thick, and ſeemed to be glandulous. The Paſſage out of this ventricle into the third was very ſtrait, having a ſort of Rugous Annular valve, and a Paſſage about an inch in length before it empties it ſelf into the third ventricle.

‖ *Tab.* 1. *fig.* 6. *f.*

The *Tunicles* of the *third* ventricle were much the ſame with thoſe of the Inteſtines, and in it nothing is more remarkable than the ‖ *Pylorus* or Paſſage into the *Duodenum*, the Tunicle there being ſo contracted and purſed in, that it leaves a Paſſage only about the bigneſs of the hollow of a Gooſe-quill, though outwardly 'tis almoſt

almoſt as large as either the Ventricle it ſelf or the Inteſtine.

Mr. *Ray* in the ſtomach of the Porpeſs he diſſected, found a great number of Sand-Eeles, Launces, or as call'd by *Geſner*, *Ammodytæ*. *Dan. Major* found in his the Spines of fiſhes, ſmall *Tellinæ* and particles of other of the Teſtaceous and Cruſtaceous kind, and Sand. In ours we obſerved the Spines of fiſhes, and 2 or 3 Herrings pretty intire, having only their outward Parts corroded. Likewiſe in the *Oeſophagus* or *Gula* (whoſe inward Tunicle was almoſt the ſame with that of the firſt ſtomach) were the bones and ſpines of ſeveral fiſhes. In the ſecond and third ſtomach was only a Chymous ſubſtance or a *Colliquamentum Chyloſum livido-albeſcens*, as *Major* words it.

Digeſtion here ſeems to be performed by a gradual Corroſion firſt of the outward parts, and ſo penetrating inwards. But whence the *Menſtruum* that performs this Office is tranſmitted, is difficult to determine. For in the inward Tunicle of the firſt Stomach there are no Glands ſeated, that might ſeparate ſuch a liquor; nor are the *Plicæ* or *Rugæ* ſo conſiderable, as to contain any great quantity of the Reliques of a former digeſtion, as to ſerve for a ſucceeding ferment; But ſeem rather a ſtrong cloſe white membrane like the inward Pellicle of the Gizard of fowls, and by this means leſs capable of any injury from the bones and fragments of ſhells that are oft contained in it. But as in fowls there is placed a little above the Gizard abundance of Glands, that ſecern a liquor that ſerves for the moiſtening and digeſting their hard food, which afterwards is farther comminuated by the grinding of the ſtrong Muſcles of that Ventricle; ſo I am apt to think that in this fiſh, the *Glandulæ Maxillares* and thoſe other that are very large and numerous, and are placed about the *fauces* and the neighboring parts, do ſeparate a *ſaliva* or liquor that may conduce much to this uſe; unleſs we may think that that large Glandulous Tunicle in the ſecond ſtomach may ſecern a Juice there, that may regurgitate into the firſt. However

ſince

ſince all Glandules do make ſome ſeparation, we may reaſonably ſuppoſe that this made by this Glandulous tunicle doth ſerve for the further fermenting the Chymous *magma* tranſmitted out of the firſt Ventricle. And nature ſeems very ſollicitous herein, by making the Paſſages out of one into the other ſo ſtrait and narrow, that it can't eaſily be tranſmitted from one to the other, before it hath undergone its due digeſtion in each.

Meeting with ſo many Bones in the *Gula*, it made me think whether poſſibly after the fleſh is corroded from them, it might not vomit them up; or whether the *Gula* may not in part perform the Office of the ſtomach, having its inward Tunicle the ſame. In ſeveral fiſhes there is no *Gula*, but the ſtomach reaches up to the Throat.

The *Inteſtines* in this fiſh were long and ſmall, being eleven times the length of the fiſh, or about fifty foot. They were almoſt equally throughout of a bigneſs, only ſomething larger toward the *Duodenum* and *Anus*. It had no *Cæcum* or *Colon*.

Opening the Extream of the *Rectum* in the inſide, I obſerved a white Pellicle or Skin like the inward Tunicle of the firſt ſtomach of this fiſh. From the *Anus* 'twas about three inches in length; above this the Inteſtine was of the ſame make as elſewhere. About an Inch and ½ from the *Anus* under this Pellicle I took notice of a pretty large glandulous body that empties it ſelf by ſeveral *ductus's* that perforate this Pellicle into the Cavity of the Inteſtine. The *Oſtia* of ſome of them were pretty large, of others but ſmall, yet would eaſily admit a briſtle into them.

The *Anus* is placed a little below the *Pudendum*, it had its Sphincter Muſcle: by the falling of the skin in ſeveral *Ruga* 'twas ſo cloſed that no water could get in.

The *Meſentery* in reſpect of the length of the Inteſtines was but ſmall, yet had numerous Meſeraic veſſels branched as in other Brutes. The *Pancreas Aſellii* was large, con-

conſiſting of abundance of Glands and ſeated in a ſomewhat ſemilunar figure. From the *Pancreas Aſellii* running towards the *Receptaculum* we obſerved ſeveral *Venæ lacteæ* pretty large, as likewiſe ſome ſmaller ones coming from the Inteſtines to the *Pancreas*.

The † *Liver* is pretty large, not divided into Lobes as Mr. *Ray* does affirm, but as in a Humane Body one intire *viſcus*. It lyes under the Diaphragme, the greateſt * portion of it in the right Hypochonder, and the ‖ leſſer in the leſt. It is in length 10 inches, in the broadeſt part about 6 and ½, but in the middle where it has the † *Ligamentum ſuſpenſorium*, about 4. It is about 2 inches thick, it weighed ℥xxvii. ½. Its Colour was of a florid red: *Bartholine* obſerved it *pallidus*. The Ramifications of the ſanguinary veſſels in it are very large and numerous. It had no *veſicula fellea* or Gall-bag, as hath been likewiſe obſerved by former Writers. The * *vena Umbilicalis* had its paſſage yet open. The figure of the Liver is beſt underſtood by the Cut.

† *Tab.* 2. *Fig.* 2.
* *A.*
‖ *B.*
† *C C.*
* *d.*

The ‖ *Kidneys* were a very pleaſant ſight, conſiſting of abundance of diſtinct Glands ſeparated by their proper Membranes from one another, but all included in one common Tunicle as they are in a Bear, a Calf, an Otter and ſome other Animals.

‖ *Tab.* 2. *Fig.* 3. *cc.*

Each Kidney is in length about 5 Inches about, 2 and ½ in breadth, and in the thickeſt part ſomewhat more than an Inch. Each Gland was about the bigneſs of a large Pea. At the outward ſurface for the moſt part they ſeemed Sexangular or Pentangular, a double order of them compoſed the body of the Kidney, and they were in all about 150 or more in each.

Each Gland ſeemed a diſtinct * Kidney; for opening ſeveral of them I obſerved a Glandulous or Cortical part which was the outwardmoſt, and was of a red Colour. Inwards there was a ſomewhat whiter ſubſtance that reſembled a *Papilla*, being larger at its baſis and riſing by degrees

* *Tab.* 2. *Fig.* 4.

degrees to a point, which I conceive to be made up of the urinary *Tubuli*; which conveys the Urine into the *Pelvis* or Cavity that is in each of them, after 'tis ſeparated by the Cortical part.

† *Tab.* 2. *Fig.* 3. *A.* The *Vena* † *Cava* was large, and did run along upon the Spine between the two Kidneys. Towards the upper part of the Kidneys, it ſent forth the *Emulgents*, which are preſently ramified, ſending a branch to each Gland. Under the *Cava*, as alſo under the emulgent veins in the Kidneys, the *Arteria Aorta* runs, and is branched accordingly. There was no common *Pelvis* belonging to the Kidneys, but a diſtinct one in each ſingle Gland. From every Gland there did ariſe a peculiar *Ureter*, but all at length uniting in one common trunk, it did emerge out of the body of the Kidney towards the lower end, as is ‖ *Tab.* 2. *Fig.* 3. *dd.* repreſented in the ‖ figure, and afterwards it was inſerted into the neck of the bladder.

* *Tab.* 2. *Fig.* 3. *BB.* The * *Glandulæ Renales* were of a triangular figure, about an Inch in Diameter. They ſeemed to conſiſt of a Glandulous membrane, which being folded up into ſeveral † *Tab.* 2. *Fig.* 5. † *Plicæ*, between them there was a ſmall Cavity, which yet was not ſo large or entire as is in ſome other Animals.

‖ *Tab.* 2. *Fig.* 3. *EE.* The ‖ *Veſica Urinaria* or Bladder was placed between the Duplicature of the *Peritonæum*, as hath been related. 'Twas of a Conical figure, five Inches long and one broad, a little below its neck, and ſo ariſing to a point at its *fundus*; being blown into, it ſeemed not capable of * *ff.* much extenſion. Of each ſide it there ran the two * *Arteriæ Umbilicales* as in Quadrupeds. The Ureters were inſerted juſt below the neck, and having opened the Bladder we could eaſily perceive their *Oſtia*, and probe into them from the bladder.

The neck of the bladder is very ſtrait, and runs along the ſides of the *Uterus*, and empties its ſelf juſt at the

bottom or rime of the *Pudendum*, having a protuberant body lying over its Orifice, which *Dan. Major* calls the † *Clitoris*, which is made up of ſtrong fibres almoſt Carti- † *b.*
lagineous.

This leads me to the Examination of the *Organs of Generation* in this Animal, which no leſs than the other parts did extremely imitate thoſe of Quadrupeds; and even in the whole diſſection I could eaſilier imagine I was cutting up a Dog, a Swine, a Calf or any other terreſtrial Brute, than an inhabitant of the watery Element.

Our ſubject was a Female; and here we ſhall take notice of the *Vaſa præparantia*, *Ovaria*, *Tubi Fallopiani*, the *Uterus*, the *Pudendum* and *Ubera*. I ſhall begin with the ‖ *Uterus*, which was about five inches in length, and had ‖ *Tab. 2. Fig. 3. L.* two large * *Cornua* as in multiparous Animals, each * *NN.* about four inches long. The *Cornua* were faſtened to the *Peritonæum*, and had membranous † *Alæ* faſtened to the † *TT.* ſame alſo. All along the inſide of the *Cornua* we obſerved to run a *Manipulus* of ‖ muſcular fibres, which ‖ *RRR.* expanding themſelves at length into two originations, were inſerted into the *Peritonæum* at the ſides a little below the Diaphragme. Ariſing alſo from the *Ovaria* and extreams of the *Tubi Fallopiani*, there were other * fibres * *QQ.* that inſerted themſelves likewiſe into the *Peritonæum*. Both theſe fibres may ſerve to regulate the motion of theſe Parts, either for the conveighing the Eggs from the *Ovarium* to the *Tubus*, or the excluding the *fœtus* from the *Cornua* into the *Uterus*.

Having opened the *Uterus* I could eaſily obſerve a diſtinction of a *Vagina*, an *Os Uteri internum*, and *fundus*. The *Vagina* was pretty large, had ſeveral *Rugæ* or *Plicæ*, but towards the *fundus* theſe *Plicæ* croſs-wayes were ſo very large and over-folding that they ſeemed almoſt wholly to occlude the Paſſage, or at leaſt to render it very difficult to probe, and made a very ſtrict *Oſtium*. This part in the inſide had *ſtriæ* or *fibræ longitudinales*.

Between

Between its *Plicæ* I did obſerve a pretty Quantity of a mucous ſubſtance contained, as alſo in them and in part of the *Vagina* ſeveral ſmall Glands about the bigneſs of a Pin's head. Theſe probably may ſerve for the ſeparating this *mucus*, which I can't imagine to be any thing of a *Colliquamentum Genitale*, which *Major* ſeemed at firſt to ſuſpect; but rather of the ſame nature with that found in Cows and other Animals.

† oo. At the extreams of the *Cornua* were the † *Tubi Fallopiani* pretty large, when blown up, running in an undulating line the length of the *Ovarium*, and then reflected and terminating in a large *Oſtium*, to which as alſo to the extreams of the *Ovarium* thoſe muſcular fibres before deſcribed did run, being firſt colligated into a ſmall node or *Plexus*, and thence expanding themſelves.

This I ſuppoſe is what *Major* means by his pervious paſſage from the Teſticles to the *Uterus*, though he had * P. P. forgot to what part of the *Uterus* it did go. The * *Ovaria* or teſticles in our ſubject were a little more than an Inch in length, about the bigneſs of a Gooſe-quill, in Colour ſomewhat whitiſh, its ſurface ſmooth. *Major* obſerved it tuberous and unequal. *Bartholine* in one that had a *fœtus* in the left *Cornu*, obſerved the left teſticle tumid and as big as a Wall-nut, but the right was longer and ſlenderer. Opening the *Ovaria* I could obſerve the rudiments of many Eggs, but very ſmall.

‖ S S S. The *Vaſa Præparantia* and ‖ Sanguinary Veſſels that came to theſe parts, were more numerous and larger than in any Animal I have hitherto diſſected, but running in a greater plenty to the *Cornua* and *Ovaria* than to the *Uterus* its ſelf. They had frequent *Anaſtomoſes* one with another; and being ſo very large and thick ſet, afforded a very pleaſant ſight; Nature ſeeming here mighty ſollicitous and provident for the nouriſhment, as well as forming the *fœtus*; it being a Viviparous Animal; and in one that was pregnant with young that *Bartholine* diſſected, he obſerved a *Placenta*, a *Chorion*, *Amnion* and *Allantois*, a *funiculus Umbilicalis*, in the *fœtus* the *Vena* and *Arteria*

Umbilicales, an *Urachus*, a *Canalis Venoſus*, *Canalis Arteriosus* and *foramen Ovale*, all as in the Embryo's of terreſtrial Animals or Quadrupeds. Nor are the Organs of Generation in the Males different, they having (as hath been obſerved by the ſame *Bartholine*, as alſo Mr. *Ray*, *Rondeletius*, *&c.*) a large *Penis* partly ſheathed within the body, as in a Bull, *Teſticuli*, *Epididymides*, *Vaſa Præparantia*, *Deferentia* and *Proſtatæ*, ſo that there is no doubt here of their manner of Generation, though in other fiſhes where there is no *Penis*, 'tis more obſcure.

It remains that we deſcribe the *Pudendum* and *Ubera*. The outward *Rima* of the former was about ſix inches in length; dilating it a little we could diſcover what *Major* calls the *Alæ* and ‖ *Clitoris*. The latter being a ſmall hard body protuberating over the *Meatus Urinarius*. The Paſſage into the *Uterus* was ſtraitned by the ſubſiding of the membranes into ſeveral *Rugæ*. For the governing the Motion of this part we obſerved ſome muſcles were appointed, as likewiſe of each ſide there were two ſmall bones which did form an *Os Pubis*. *Rondeletius* obſerved the like in a Dolphin. ‖ *Tab.* 2. *Fig.* 3. *h.*

The * *Ubera* were placed of each ſide the *Pudendum*, only two in all, each ſide one. The Teat or *Papilla* was ſmall and retracted inwards, ſo that without dilating the Part we could only ſee outwardly a ſlit or *Rima*. In time of Lactation this part I ſuppoſe is much larger and more protuberant, this being but a young one and never (as was ſuppoſed) impregnated. (*l*) *Rondeletius* denyes that there are any *Papillæ* conſpicuous in a Dolphin, but ſaith, *Harum vice Alveoli humoris duo ſunt, utrinq; unus, è quibus lac fluit, quod ore Catulorum Parentes ſectantium excipitur*; and in another (*m*) place does quote *Ariſtotle* (*Hiſt. Animal. l.* 2. *cap.* 13.) for the ſame Opinion, which yet does ſeem to me leſs probable. The Udder or *Ubera* under the skin ſeemed to be very large, conſiſting of abun- * *i i.*

(l) *Rond. de Piſcib. l.* 16. *c.* 8. *p.* 462. (m) *Rond. de Piſc, l.* 3. *cap.* 23.

dance

dance of ſmall Glands ſomewhat diſtinct and ſeparate from one another. Several bloud-Veſſels did run to them; and generally I may ſay of the whole Body, there is ſcarce any Animal in which the Veins and Arteries are more curiouſly branched or more numerous than in this. For on the † *Muſculus Pſoas* their Ramifications were ſo many and large, and their *Anaſtomoſes* into one another ſo frequent, that they formed a curious Net-work, and afforded a very pleaſant ſight. And no leſs Curioſity we obſerved in the bloud it ſelf, by examining a ſmall part of it with a good Microſcope: for after it was a little dryed on the object plate which was of Glaſs, we found that it had ſhooted into a moſt delicate regular figure, being reticular like the texture of the *Omentum*; only that from the ſides of the ſeveral *Area's*, there were ſome ſmall branches or ſhootings of fibres that were not continued.

† *Tab.* 1. *Fig.* 2. *H.*

We come now to the *middle Venter* or the *Thorax*, which was large and capacious, covered with Muſcles almoſt as in Quadrupeds, having two large Pectoral Muſcles that went to the fore-Fins, as likewiſe ſeveral other Muſcles that did ſerve for the performing its various Motions, and were curiouſly contrived. There were two *Muſculi Intercoſtales*, *externus* and *internus*. It had * thirteen Ribs of each ſide, five faſtened to the *ſternum*, two other had Cartilages, but not quite continued to the *ſternum* unleſs by tendons. The Ribs as they deſcended grew ſhorter, ſo that the laſt was but a little higher than the *Muſculus Pſoas*. I ſhall give a fuller account of the Ribs, as alſo the *Sternum*, when I come to deſcribe the *Skeleton*, and ſhall only add that the Ribs ariſing from the Spine do incline towards the *Abdomen*, ſo that they make a very acute angle with the Spine. The Cartilages or rather bones that go from the firſt five Ribs to the *ſternum*, are reflected upwards towards the head and make with the *Coſtæ* acute angles alſo. At the upper part of the ‖ *ſternum* which was broad and ſome-

* Vid. *Tab.* 1. *Fig.* 2. & *Tab.* 2. *Fig. x.*

‖ *Tab.* 1. *Fig.* 2. *d.*

ſomewhat depreſſed there were inſerted two large and thick Muſcles that ran towards the *Maxillæ*. Theſe probably by contracting may ſerve to draw the *Sternum* upwards, as the *Muſculi recti* which are inſerted into the bones of the *Sternum*, downwards, and ſo promote Reſpiration; which likewiſe is farthered by thoſe other Muſcles, which are alſo common with this fiſh and other Quadrupeds that are deſtined to that office, and chiefly by the

* *Diaphragme*, which in this Animal was very remarkable; for it had no *Aponeuroſis* or Membranous tendon in the middle, but was muſcular throughout. It was faſtened to the *Sternum*, the Cartilages and the other Ribs downwards. It had a deep hollow in the middle, as it were pulled into the *Thorax*, which was occaſioned by having the *Pericardium* faſtened to it which did draw it in. The Tendons of this Muſcle were very curious: for beſides thoſe large ones that did run down by the Spine, there were ſeveral *Manipuli* of other tendons that went over the *Muſculus Pſoas*, and even in the middle or body of the Diaphragme there did appear abundance of tendons running over the muſcular fibres, as where the *Vena Cava* perforates it, and in other places, though not very regularly or in any ſet order, but more confuſedly. Theſe tendons appeared of both ſides the Diaphragme. * *ib. f.*

Dan. Major mentioneth a *Mediaſtinum* but we could obſerve none, but it was ſupplyed by the joyning of the *Pericardium* to the *Sternum*; 'twas faſtened alſo to the Diaphragme as in men, and did draw it upwards. The *Pericardium* was very large; what water was in it I do not well remember; *Bartholine* obſerved it to be cruentous, which I ſuppoſe was from the diſſection.

The † *Heart* was long, of a triangular figure, about four Inches from the baſis to the Cone, and as many at the largeſt part of the baſis, about an Inch and ½ thick. † *Tab. 2. Fig. 6.*

It

It had two large Ventricles and as many Auricles. Towards the Cone the Ventricles ſeemed a little divided. The valves of the Ventricles and of the *Arteria Pulmonalis* and *Aorta* were not different from thoſe in Quadrupeds, but the *Carneæ Columnæ* in the left Ventricle were larger and more numerous and curiouſly interwoven lattice-wiſe.

The *foramen ovale* was cloſed and not open; where it had been, we could perceive by its thinneſs and tranſparency. We did not think of it then to look for the *Canalis Arterioſus*, but probably its paſſage may be likewiſe ſhut, as is alſo the *foramen ovale* in a Beavor and an Otter, as it hath been obſerved by ſome at (*n*) *Paris*, though 'tis delivered by others that in theſe Amphibious Animals 'tis kept open, that they may be the better able to keep under water, the Circulation of the bloud being continued by this means without being tranſmitted into the lungs as it is in the Embryo's of Quadrupeds *in Utero*. The ſame is affirmed by (*o*) *Severinus* concerning Ducks and Geeſe, and thence he gives a reaſon why they are not ſuffocated by diving under water ſo long, or ſtrangled when holden by the neck in ones hand.

* *Tab.* 1. *Fig.* 3. *CC.* The * *Lungs* had only two large lobes, each of them about ten inches long and about 4 and ½ broad, and two inches thick when not extended, and did in one part adhere to the Diaphragme a little below the entrance of the *Bronchia*. It had ſeveral *Glandulæ* containing a Steatomatous matter. The Lungs were encompaſſed with a ſtrong membrane, which being taken off, the minute ramifications of the Sanguinary Veſſels were very pleaſant to behold. The *Parenkyma* of the Lungs was the ſame with that of Quadrupeds, and when blown up were very large; which makes me ſuſpect the truth of that aſſertion of (*p*) *Rondeletius* concerning the

(n) *Memoires pour ſervir à l'Hiſt. Nat. des Animaux.* (o) *Phoca illuſtrat. p.* 37. (p) *Rond. de Piſc. l.* 16. *c.* 8.

lungs

lungs in a Dolphin that they are *denſiore ſubſtantiâ quàm in terreſtribus, craſſitudine & colore Epar referunt.* And the reaſon he gives wherefore it ſhould be ſo, ſeems not ſatisfactory.

The *Windpipe* or *Arteria aſpera* was very ſhort, as it muſt needs be, this fiſh having no neck. The *Larynx* was of a ſingular figure and very remarkable, which I ſhall deſcribe with the parts belonging to the head. But before I leave the *Thorax* I muſt take notice of a ſeeming † Glandulous body that did lye of each ſide the *Spine* about two inches broad and the length of ten or eleven Ribs. It was continued likewiſe a little over ſome of the Sanguinary Veſſels that went to the head. It was a curious contexture of ſanguinary veſſels variouſly contorted and winding, emerging from the *Medulla Spinalis* at the holes where the Nerves come out between the Ribs, and as we afterwards obſerved the ſame ſubſtance likewiſe for a good thickneſs covered the *Medulla Spinalis* throughout. In the *Thorax* in ſome places 'twas above a quarter of an Inch thick, but every where it appeared of the ſame Contexture, a winding and convolution of bloud-Veſſels. What this part may be, is more difficult to aſſign, ſince it does not uſually occur in the diſſection of other Animals, and has not been taken notice of, as I know of, by any in this. But whether it may be that the heat of ſo much bloud contained in ſo many veſſels may ſerve for the invigorating the Animal Spirits in the *Medulla Spinalis*, or whether it may not be a Glandulous body and ſo ſerve for the draining of the ſeroſities of the bloud and thereby render it fitter for generating Spirits, or what other uſes it may have, is to me yet obſcure. Formerly diſſecting a fiſh which *Hippolytus Salvianus* calls *Lupus*, under the *Cranium* I obſerved a much like ſubſtance enveloping the Brain, and was of a good thickneſs; the *Pia Mater* in Colour and luſter exactly imitating leaf Gold.

† *Tab.* 2. *Fig.* 7.

Above

* *Tab.* 1. *Fig.* 2. *c.* *Above* the *ſternum* was placed the * *Thymus*, which was a large Conglomerated Glandule. We obſerved likewiſe the *Glandulæ Maxillares*, *Glandulæ Thyroideæ* and ſome others. At the root of the tongue there were ſeveral ‖ *Tab.* 1. *Fig.* 3. *aa.* ſmall ‖ *foramina*'s which we ſuppoſed to be the *Oſtia* of ſalivatory *Ductus*'s; We could probe them with a briſtle. But where the *ductus ſalivalis* of the Maxillary Gland was inſerted, either our inadvertency or want of leiſure made us neglect to examine.

The *Rictus of the Mouth* is but ſmall, yet the paſſage into the *Gula* is pretty large and open. The *Teeth* are ſo placed that thoſe of one Jaw are received into the diſtances of the other. There are twenty four of each ſide either *Maxillæ*, ninety ſix in all. They are but ſmall, and all of the ſame form, ſomewhat acute. Wherefore (*q*) *Jonſton* is miſtaken who ſaith, they have *dentes obtuſos Hominis molaribus ſimiles*. Theſe teeth are ſomewhat moveable as is obſerved by *Dan. Major*, ſince they are not faſtened in diſtinct ſockets or Cells as is uſual in other Animals, but only by a ſtrong membrane or Cartilage, there being one common furrow in each Jaw into which the Extreams of all of them are received: Theſe teeth are ſo ſmall and ſhort that they ſeem unfit either for maſtication or fight, but only to detain their Prey till ſuch time as they can conveniently ſwallow it whole. (*r*) *Rondeletius* does obſerve that in fiſhes that do ſuck, the teeth are at firſt ſoft and covered, that they might not injure the Breaſt. But Nature here does ſeem farther provident, in that juſt before it has left a ſpace void of teeth, and the neighbouring teeth that are next it are alſo ſhorter than the reſt.

(*q*) *Jonſt. Hiſt. N. de Piſc. l.* 5. *p. m.* 221. (*r*) *Rond. de Piſc. l.* 3. *c.* 7.

The * *Tongue* was very curious, of a muſcular or fleſhy † *Tab.* 1. *Fig.* 3. *A.* ſubſtance, a little indented at the edges, about 2 Inches and ½ long, and about 1 and ¼ broad and pretty thick, but ſo firmly faſtened all along to the bottom of the Mouth, not to the Palate as *Major* and *Bartholine* ſay, that it can't exert or thruſt its ſelf out beyond the Verge or Limits of the Mouth. And herein a Porpeſs differs from a Dolphin: for as *Rondeletius* does obſerve, *Delphinis lingua eſt mobilis, quæ modò exeri, modò condi poteſt, non hærens Palato*; and the ſame is aſſerted likewiſe by *Pliny*, *Solinus* and others: and expreſly in (ſ) *Rondeletius*, *Delphin linguam longiorem habet Marſuino, Marſuinus eo latiorem*: and therefore in his Figure he repreſents it hanging out. The uſe of the Tongue here I conceive is not for forming a voice; for that *grunnitus* they ſometimes make may be rather formed in the parts of the *fiſtula*; nor probably for taſting, ſince they ſwallow their prey whole: But rather when young to help the motion of ſucking, and when elder that of deglutition.

At the Root of the Tongue was the ‖ *Larynx* which ‖ *Tab.* 1. *Fig.* 3. *B.* was very long and protuberating, having its extremity anſwering and ſomewhat inſerted into the bottom of the *fiſtula*, like a Ducks bill: *Bartholin* ſaith that *Collum Anſerinum refert*; Mr. *Ray* makes it to reſemble the Neck of an old faſhioned Ewer, as *Caſſerius* likens that of a Hog to a *Guttarnium*. The make of it was very curious and different from other Animals, chiefly in the length of the *Cartilago Arytinoides*, the *Epiglottis*, and the Structure of the *Scutiformis* or *Thyroides*. The * *Cartilago Annularis*, or *Cricoides* was much the ſame as in other Brutes. But the † *ſcutiformis* here was not one entire Cartilage but two † *B B.* ſeparated from one another, by the interpoſition of the Baſis of the *Epiglottis*, running up the ſides of it pretty broad, and ſending down a narrower proceſs to the Ex- * *Tab.* 1. *Fig.* 5. *A.*

(ſ) *Rond. de Piſc. l.* 3. *cap.* 9.

tream

tream of the *Annularis*. The *Cartilago Arytænoides*, (t) *Caſterius* ſaith, is difficult to deſcribe, *præſertim cum pro diverſitate ſubjectorum, eam quoq; variari utplurimùm contingat*; but in none, as hitherto I have obſerved, more than in this. For 'tis ‖ protuberating beyond the *Annularis*, above an Inch and ¾. 'Tis two diſtinct Cartilages, joyned together by a ſtrong membrane. At the end it has † thick lips, and in the middle a † *Rimula* which (u) *Veſalius* makes to be the *Glottis*, though thoſe that make here five Cartilages do reckon this to make up the number. The * *Epiglottis* was no leſs remarkable, and its ſtructure as different. 'Twas about two Inches in length, large at its *baſis*, and faſtened to the narrow part of the *Annularis*. As it aſcends it becomes narrower, having its ſides more cloſed together. At its extream it hath a large thick ſemicircular lip which ſerves to cover the *Rimula* or *Glottis*, though not protuberating much over it as in other Animals. The various Muſcles that did ſerve to govern the Motion of theſe Cartilages were no leſs admirable and curiouſly contrived. But in this ſingle ſubject we had not leaſure to go through with them, being more intent upon the *Viſcera*. We obſerved the *Glandulæ Thyroideæ* to be pretty large.

‖ c c.

†† *Tab.* 1. *Fig.* 4. *a.*

* *Tab.* 1. *fig.* 5. *DDD.*

† *Tab.* 1. *Fig.* 2. *B.* The † *Os Hyoides* was very large and curious: and although *Dan. Major* hath mentioned an *Os Hyoideum reduplicatum*, yet I find he hath committed a double miſtake concerning it; for it conſiſting as it were of two parts, the one he makes, I know not how, the *Os ſterni*, the other the *Claviculæ*. The firſt, which in his figure he gives us for the *Os ſterni*, and ſaid conſiſted of three Bones, in ours it was but one, but was of the figure he hath well expreſſed it in, *viz.* triangular or having 3 Proceſſes, 2 whereof were two inches long, and in ſome parts about ¼ of an Inch broad, and had their extremities diſtant from one another about three Inches. The third Proceſs was

(t) *Jul. Caſterius Placentin. de Vocis Auditûſq; organis, l.* 1. *c.* 1.
(u) *And. Veſalius Corp. human. fabrica. l.* 1. *c.* 38.

much ſhorter, but from it there did ariſe two large Cartilages, which after a little while being reflected, had joyned to them two narrow Bones, which were three inches long and bended like Ribs. Theſe laſt I ſuppoſe *Major* took for the *Claviculæ*, although (v) *Rondeletius* ſaith that Dolphins have no *Claviculæ*, nor did I meet with any in this fiſh.

In the lower *Maxilla* there was a large Cavity filled with a ſubſtance that reſembled a Glandulous body or rather fat, different from that of the reſt of the body, and conſiſting of ſeveral little bodies orderly placed together, more ſhining and leſs fluid. Since the diſſection this part hath made me think of the *Sperma Ceti*, which is ſaid to be found in the head of a ſort of *Burmudas* Whale; but ſince by other Relations 'tis rendred dubious whether there might not from other parts likewiſe be obtained the ſame tallowy fat we call *Sperma Ceti*, or at leaſt being ignorant in what particular part in the head it is, that this does lye, it has ſtifled a conjecture, whether poſſibly this might not be ſomething analogous to that in Whales, ſince a Porpeſs is of the Cetaceous Kind and hath ſo many parts the ſame and common to both, as eſpecially what we ſhall deſcribe next, the *Spiraculum*, *Fiſtula* or *Spout*.

The *Pipe* or *Spout* in this fiſh is its Noſtrils, and ſerves for the conveyance of Air in Reſpiration, as the *Nares* in other Animals: But hath alſo this additional uſe, for the ſpouting out of water, which when with its prey it receives in a great Quantity not convenient to be ſwallowed, and having no Gills, it may be ſent out this way without hazard of loſing what it had taken. Its contrivance is very curious, ariſing from the Palate with a ſingle *foramen*, but when it perforates the ‖ *Cranium*, 'tis divided by an oſſeous *ſeptum* into two, but above ‖ *Tab.* 2. *Fig.* X. aa.

(w) *Rond. de Piſc. p.* 461.

it

it is united again into one, making in the skin a kind
† *Tab.* 2. *fig.* 9. A. of † ſemilunar ſlit or *foramen*. At the lower Orifice as alſo above the *Cranium* it had ſeveral ſtrong and fair muſcles, which doubtleſs ſerved for the regulating its motions in ſpouting out the water. In the inſide of the *fiſtula* below the *ſeptum* there were abundance of holes or *Papillæ* which I took for the Orifices of Glands, and Mr. *Ray* does obſerve that if you do preſs them, there would ſtart out a certain glutinous liquor: Which *Mucus* may ſerve for the lubricating the inſides of the *fiſtula*, as alſo defending them from the acrimony of the ſalt water, and may be likewiſe a recrement caſt off from the bloud as is the ſnot in other Animals. Over the two hollows of
* *Tab.* 2. *Fig.* 8. *CC.* the *fiſtula* juſt above the *Cranium* there lye two * protuberating bodies like an *Epiglottis* or Valves, which as Mr. *Ray* does likewiſe obſerve, ſerve to ſtop the Pipe that no water gets in there without the fiſhes will. Near this there are placed four Bags or two pair of them. The
‖ *Tab.* 2. *Fig.* 9. *BB.* and *fig.* 8. *D D.* * *Fig.* 8. *E.* firſt ‖ pair which is the largeſt, lyes upon the middle of the *Roſtrum* or ſnout, it hath at firſt one common * *foramen*, then ſubdivides into two cells, each of which will contain a large Nutmeg; they are covered on the inſide with a black skin, and ſeem to be made up of a griſtly ſubſtance, formed into ſeveral *Plicæ* or folds lengthways, ſomething reſembling the *os ſpongioſum* in ſome other Animals, and poſſibly may have ſomething of the ſame uſe, at leaſt may ſerve for the forming the noiſe they make againſt ſtorms
† *Fig* 8. *FF.* and bad weather. The two other or † ſecond pair are placed higher and more to the ſides of the *Roſtrum*; their cavity is not ſo large, but in it is contained a conſiderable
‖ *G G.* ‖ Glandule about the bigneſs of a Filbird, which may ſeparate a liquor ſerving to ſome of the uſes before deſcribed. By having this membrane over it, it in part reſembled the *Tonſils*. Mr. *Ray* mentioneth a third pair tending towards the brain, having a long but narrow paſſage, for the uſe as he conjectured of ſmelling; but opening the Brain, neither of us could find either Olfactory Nerves or *Proceſſus Mamillares*. This laſt pair I did

did not take notice of my ſelf, though I do not deny but that they may be there.

Rondeletius denies that fiſhes have *Eye-lids*, where he ſaith, (x) *Palpebris verò omnes* (*ſc. Piſces*) *carent, quòd commodè nictare in Aquâ non poſſunt, ſed duriores Oculi facti, nè facilè ab Aquæ ſalſedine, quæ irrorat, læderentur.* And elſewhere, *Palpebrarum defectum Corneæ duritie penſavit Natura, quæ undiq; Oculum ambit, non ex adverſo Papillæ tantùm ut in hominibus.* Which though true in ſeveral fiſhes, yet holds not good in this, for here we muſt grant *Palpebræ* or Eye-lids. Their aperture was but ſmall, and on the inſides of the upper Eye-lid we obſerved *Steno*'s *ductus*'s very fair, and did put in Briſtles into ſeveral of them, that did run into the *Glandula innominata*, from whence they did ariſe, which Gland was very large. *Jonſton* out of *Cardan* affirms that a Porpeſs ſometimes weeps; if there be a Paſſion, there wants not matter here for tears. However this humour may ſerve for the waſhing off the Brine of the Sea water from fretting the Eye, which in this hot Animal perhaps may be tenderer than in other fiſhes, which have for this uſe a proper Tunicle, which is a continuation of the *Cutis* that covers the *Cornea* and is tranſparent, as is plain in *Whitings*, *&c.* The *Orbit* of the Eye was not ſo perfect or compoſed of bones as in other Animals, but at the lower part it had only a very thin ſmall bone. The Bulk of the *Eye* in proportion to the body was but ſmall, being not ſo big as in a Sheep. It had all the Muſcles very fair as in a Man, and likewiſe the *Muſculus ſeptimus* or *ſuſpenſorius* that is proper to Brutes, and which did incloſe the Optick Nerve. The uſe of this in Brutes that are *prono Capite*, is thought to be, to ſuſpend the Bulk of the Eye that it receives no injury from the declivity of the head; but there being not that danger here, Nature that does nothing in vain, muſt have ſome other intendments, and probably

(x) *Rond. de Piſc. l.* 3. *c.* 2. *p.* 47.

it

it may be, that by its equal contraction of the *Sclerotis* to which 'tis faſtened, it renders the Ball of the Eye more or leſs ſpherical, and ſo fitter for viſion. The *Tunica ſclerotica* was much more denſe and hard than in other Animals. The *Choroides* was party-coloured, a mixture of Blue and Green, which is not in the *Porcus terreſtris*. The *Pupil* was Oval which is not ſo common in other fiſhes. The *Cryſtalline Humor* was of a Spherical figure, but ſeemed to be a little more convex in the anterior than poſterior part. The *Optick Nerve* was not inſerted ſo laterally as in Quadrupeds, but rather in *Axe Oculi*.

The *Brain* in this fiſh was large, it weighed xvi ½ and reſembled much more that of Quadrupeds than fiſhes. Its figure was ſomewhat ſhort, but what it wanted in length, it had in breadth. The *Cerebrum* was ſeparated from the *Cerebellum* by an *os triangulare*, as in Dogs and ſome other Animals. The Brain was divided into two Hemiſpheres, though *Rondeletius* does ſay that in a Dolphin 'tis not divided into *dextrum & ſiniſtrum*. It had its *Anfractus*, but not ſo deep as in ſome. Its ſurface was curiouſly ramified with bloud-veſſels. There were the *ſinus's* and *dura* and *pia Mater*, the *ſubſtantia Corticalis & Medullaris*; Nor in any thing was it more different from the uſual make and conformation of it in other Animals than in the defect of the Olfactory Nerves and *Proceſſus Mamillares*, which is likewiſe taken notice of by Mr. *Ray*. But for all this (y) *Rondeletius* thinks they ſmell, where he ſaith, *In Delphinis nec foramen* (Narium) *nec meatus ullus eſt, etiamſi ſagaciſſimè odorentur, ut teſtis eſt* Ariſtot. (Hiſt. Anim. c. 8.) *& Experientia ipſa confirmat*. The Optick Nerves were large, and did ſeem to be united as in men, and not ſo plainly to decuſſate each other as is uſual in ſome fiſhes. We obſerved the *Nervi Oculorum motorii, Pathetici, &c.* in all about eight or nine Pair. The *Infundibulum* and *Glandula Pituitaria* were

(y) *Rondel. de Piſc. l. 3. cap. 8. p. 57.*

very;

very fair. How the *Glandula Pinealis* was, we did not well obſerve, it being moſt decayed, as we ſuppoſed by keeping. But the ~~Tunica~~ *Choroides* did ſpread its ſelf in both ventricles, and being united on the *Medulla Oblongata*, did run down the length of above half an Inch; 'twas the breadth of a Gooſe-quill, and did ſeem thicker than uſual, and was a curious contexture of bloud-veſſels. As for the inward parts of the Brain we did obſerve all as delineated in Dr. *Willis*'s figures; and though Mr. *Ray* does ſay that he did not obſerve in that which he diſſected, thoſe Protuberances call'd *Nates* and *Teſtes*, yet we ſaw them both very fair, but the *Teſtes* were much larger than the *Nates*. The *ſubſtantia Medullaris* in the *Cerebellum* was very Curious and ramified like Ferne. From the *Medulla Spinalis* upwards the *Cerebellum* was flatter and leſs protuberant than in other Animals. The *Medulla Spinalis* was covered, as is related before, with a thick Glandulous, or at leaſt vaſcular Tunicle, it ſends forth abundance of Nerves, and at length makes a large *Cauda Equina*.

Mr. *Ray* ſaith that the largeneſs of the Brain in this fiſh, and the Correſpondence of it to that of a Man's, argues this Creature to be of a more than ordinary Wit and Capacity, and makes to ſeem leſs fabulous and improbable thoſe antient ſtories related by *Herodotus* concerning *Arion*, by (*a*) *Pliny* the Elder concerning a Dolphin enamoured of a Boy, whom he was wont to carry croſs a Bay of the Sea from *Baiæ* to *Puteoli* to School, and by (*b*) *Pliny* the younger of another enamoured of a Boy at *Hippo* in *Africa*, whom he was wont to carry on his back in like manner. (*c*) *Pauſanias* has a like ſtory, and (*d*) *Plutarch* relates how *Eualus* was ſaved by Dolphins in like manner as *Arion*. *Dio Chryſoſtom* not only relates the ſtory of *Arion*, but adds that the Mariners were executed, and *Jo. Scaliger in Animad.*

(a) *Plin. Hiſt. Nat. lib.* 9. *c.* 8. (b) *Plin. Epiſt.* 33. *lib.* 9. (c) *Pauſan. in Laconic.* (d) *Plutarch. in Sympoſ.*

in

in Euſeb. p. 84. does aſſert it to be no fable but a true Hiſtory. But (f) *A. Gellius* makes it to be an Impoſture of *Herodotus*, as alſo does (g) *Strabo.* And conſidering the Lubricity of the skin of this fiſh, the protuberancy of its back, and its undulating not horizontal motion in ſwimming, it does confirm their Cenſure,

—ſed quid non Græcia mendax
Audet in Hiſtoria?

However *Severinus* (in his *Phoca illuſtratus, p. m.* 27.) relates out of *Fran. Lopes* (*Hiſt. Indicæ General. cap.* 31.) that a *Manatus* or ſort of Sea-calf was kept in a Lake in *Hiſpaniola* that was grown very tame, and did uſe to carry on his back from one ſide of the Lake to the other ten boyes at once.

Ariſtotle (i) grants that Dolphins hear, but ſaith, they have no *Ears*; (k) *Pliny* writes the ſame, but we rather concur with *Rondeletius*, (l) *ſed iſta ex diſſectione falſa apparent; meatus enim audiendi in Delphino hujuſmodi comperiuntur, quales ad ſonos percipiendos idonei eſſe poſſunt.* 'Tis true they have no *Auriculæ*, which though they would advantage their hearing, yet would injure their ſwimming; and the *Porus Auditorius* is extream minute and ſmall, for if larger, the water getting into it, might likewiſe prove an Inconvenience. But the ſtructure of the Organ of the Ear, or the *Os* * *Petroſum* in this Animal is very remarkable, and different from any that I know yet deſcribed. 'Tis ſeated in a large cavity of the *Cranium*, but not locked in by ſutures or the joyning of the other Bones, but faſtened chiefly by the intervention of Muſcles: 'Tis the hardeſt bone in the body, its colour white, its figure irregular, and difficult to be deſcribed

* *Tab.* 2. *Fig.* 12.

(f) *A. Gellius Noct. Attic. l.* 16. *c.* 19. (g) *Strabo l.* 13. (i) *Ariſt. Hiſt. Anim. l.* 1. *c.* 11. (k) *Pliny Hiſt. Nat. l.* 11. *c.* 37. (l) *Rond. de Piſc. l.* 3. *c.* 3. *p.* 50.

by words. As fixed in the *Cranium* you may obſerve in its ſurface a winding † *Sinus* or furrow that leads to the ‖ *Tympanum* that is placed a little within the bone. At the *Proceſſus Mamillaris* it has three large Protuberances or *Proceſſus*, and at its oppoſite extream inwards a hollow, which is better perceived when the bone is taken out, for then you may obſerve a large * Cavity that leads into the Hollows of the Ear-bone, beſides ſeveral other *foramina*'s that afford paſſages to the Nerves or ſome ſmall muſcles; ſo that the Ear here is not a continued and entire bone forming a Cavity within its ſelf, but at its inward part where joyned to the *Cranium* 'tis perfectly divided and ſeems to make two bones, being joyned together only at its anterior part, where is the *Tympanum*. Sawing it there aſunder, one part of the bone ſomewhat reſembled a ſort of *Concha Veneris*, and at one place was very † thick and ſolid, the other was a thinner *Lamina* making the Cavity; the other part of the bone was likewiſe very thick, having three large Protuberances, the middlemoſt which was oppoſite to the *Tympanum* at its outſide, had a large ‖ *foramen*, which afterwards divided into others; here we ſuppoſed the Auditory Nerve entered. This bone by its winding ſomewhat reſembled a * *Cochlea*, and at its inſide oppoſite to the *Tympanum* there went ſeveral fibres or ſmall minute Muſcles, which by their contraction and keeping this membrane tenſe, might perform their Office and ſupply their defect, Nature never being wanting of means for the attaining her end, though not alwayes making uſe of the ſame. So poſſibly it is that ſince there is ſo open a Cavity at its poſterior part, it has made the bones there ſo thick and denſe, that the ſound may be more intenſe from the greater Colliſion of the Air on ſo ſolid a body. Where there were a deſign of giving the Comparative Anatomy of the Organ of this Senſe in various Animals, this may well deſerve a ſtricter inquiry into. *Dan. Major* hath given two Figures of this bone, but without its explanation.

† *Tab.* 2. *Fig.* 12. *a.* ‖ *B.*

* *Fig.* 13. *C.*

† *Fig.* 13. *dd.*

‖ *B.*

* *a a.*

There

There remains the *Oſteology*, or to give an account of the *Bones* and *Sceleton* of this fiſh, and in general I ſhall obſerve of them, that as the Muſcles and moſt of the *Viſcera* very much imitated the ſtructure of thoſe of Quadrupeds, ſo likewiſe the Bones here came very near them, as to their ſolidity, colour and ſtructure, and in all excepting what differences the neceſſity of the figure of this fiſh occaſioned. I ſhall begin with thoſe of the Head, where I ſhall take notice of the *Cranium*, the *Roſtrum* and lower Jaw or *Maxilla*. For where (*m*) *Rondeletius* ſaith, a *Phocæna* has no *Roſtrum*, it muſt be underſtood of its appearing ſo whil'ſt the fleſh and fat is on; whoſe great bulk does render it obtuſe and curt: but when 'tis taken off it appears otherwiſe; for then the upper Jaw or *Roſtrum* from the *Cranium* to its Extremity is ſix inches long, but in a Dolphin much longer. At the beginning
* *Tab.* 2. *Fig.* x. *aa.* of this bone juſt below the *Cranium* is the *Fiſtula* or * *Nares*, which as is related before was divided by an oſſeous *ſeptum* into two Cavities. The *fiſtula* was formed partly by that bone *Columbus* calls the *Vomer*, which ariſing from the Palate does ſend a thin *Lamina* up the *Cranium*, and is continued on the *os frontis* to the great Protube-
† *B.* rance in the middle there, forming three † protuberances on the *os frontis* above the *fiſtula*. The other part of the *fiſtula* is formed by two bones, pretty large at their baſis and riſing above the ſurface of the *Roſtrum*, and ſending
‖ *c c.* down two ‖ Pyramidal proceſſes about two inches long, between the inward bones of the *Roſtrum*. For the *Ro-*
* *d.* *ſtrum* was compoſed of four Bones, the two * outward-moſt were a continuation of thoſe of the *Cranium* having two proceſſes, the firſt that compoſed part of the
‖ *f.* ‖ *os Zygomaticum*, and another about two inches lower; then it grew narrower, not being almoſt half the breadth as it was before. To be too nice and ſcrupulous in the deſcription of all the bones here might ſeem tedious and

(m) *Rond. l.* 2. *c* 5.

troubleſome ; I ſhall therefore take notice only of the moſt remarkable things : as whereas the *Cranium* was five inches in breadth, 'twas only three in length. 'Twas protuberant much above the † *Roſtrum*. The ſutures chiefly were thoſe they call *Harmoniæ*, by a ſimple line, but the *Lambdoidea* was ſomewhat indented. † at B.

By reaſon of the different bones that compoſed the *Cranium* the ſutures likewiſe were differently placed. But I obſerved that where I might expect the *ſutura Coronalis* there was a large eminency of the * bones, and juſt in the middle of the forehead over the *fiſtula* there was a large Protuberancy jutting out. Other particularities I might take notice of here as alſo in the Palate: but paſſing them aſide, within the *Cranium* we found an *os triangulare*, but ſomewhat different from that in Dogs, having at its extremity a riſing up like a *Criſta Galli*. From this bone the length of the upper part of the *Cranium* anſwering to the *ſinus Longitudinalis*, there was a pretty deep Protuberancy, that as the *os triangulare* ſeparated the *Cerebrum* and *Cerebellum*, this did the two Hemiſpheres of the Brain. I obſerved no *Criſta Galli* here, and the *os Cribriforme* was not perforated, as is uſual. The Anterior Proceſſes of the *ſella Turcica* were wanting, though there were ſomewhat of the Poſterior; but there were not thoſe *foramina*'s from it as in a mans, and other Brutes ; though it had an *Infundibulum* and *Glandula Pituitaria*. That part of the Ear-bone or *os Petroſum* which I ſaid reſembled a * *Cochlea* from its winding, does on the inſide here appear very well, and that paſſage for the auditory nerve is very fair. The Cavity for this bone is large, but a great part of it filled with Muſcles. * *c*. * *Tab.* 2. *Fig.* 13. *aa*.

Dan. Major has given a figure of the *Cranium*, but in ſome particulars he does not ſufficiently expreſs the life; but that which he gives of part of the lower *Maxilla* is more exact. It was a ‖ thin but ſolid bone; its *Lamina* on the inſide was not continued home to the Articulation, but leaving a large ſpace, that led into a conſiderable Ca- ‖ *Tab.* 2. *Fig. x. K*.

vity

vity within, which was filled with a particular ſort of fatty ſubſtance, as is before hinted. The length of the lower *Maxilla* or Jaw was about 7 Inches and ½; at the broadeſt place, towards the articulation two Inches; and in the narroweſt towards the extream, not above an Inch. It conſiſted of two bones that were joyned together at the *Mentum*.

We ſhall next deſcribe the *Spine* which conſiſted of ſixty *Vertebræ* from the † *Atlas* to the *apex* of the Tayle. *Dan. Major* numbred but fifty four, the firſt or the *Atlas* to which the *Cranium* was faſtened, was very large, having two tranſverſe Proceſſes that were long, and two others juſt below them that were much ſhorter and leſſer. It had likewiſe two Spinal Proceſſes: The hindermoſt that was much the greateſt anſwering to the Spinal Proceſſes of the other *Vertebræ*, and a ſmaller jutting ſomething towards the head. This hindermoſt Spinal Proceſs, at its extremity had a diviſion, that it might receive the Spinal proceſs of the next *Vertebra*; which ſeem providently contrived, that ſo it might not hinder the erection or flection backwards of the head. Under this firſt *Vertebra* there was the appearance of two other ſmall ones, which may be reckoned thoſe of the Neck. The *Vertebræ* of the *Thorax*, as alſo the *Abdomen*, had tranſverſe, ſpinal and oblique proceſſes; but thoſe of the upper *Vertebræ* were ſmaller than of the lower, all being largeſt about the beginning of the *Abdomen*. In the firſt ſix *Vertebræ* the Poſterior Spinal proceſs, upon flection of the body, is received into the Cavity of the Anterior; but in the other *Vertebræ* that of the Anterior into the Poſterior; but the ſeventh *Vertebra* ſeems dubious between both. So the tranſverſe or lateral proceſſes of the *Vertebræ* of the *Thorax* are oblique deſcending. The four firſt of the *Abdomen* do lye at right angles with the *Vertebræ*; but the remaining are obliquely aſcending. The oblique Proceſſes in the firſt *Vertebræ* of the *Thorax* ſeem to be *Epiphyſes* of the tranſverſe, but as they do deſcend, they

† *m.*

they grow gradually higher and higher on the Spinal, forming two cheeks, into which is received the back of the anterior ſpinal proceſs.

Beſides theſe proceſſes already mentioned below the *Abdomen* and oppoſite to the ſpinal proceſſes, I find * others not ariſing from the *vertebræ* themſelves, but that Cartilaginous body that joyns the *vertebræ* together. They conſiſt of two ſmall bones joyned together at the end, but diſtant at the baſes, ſo occaſioning a hollow, through which there runs abundance of bloud-veſſels; as the *Medulla Spinalis* does in the Cavity of the Spinal proceſſes. Theſe proceſſes, as do all the other, grow leſſer as they approach the Tayle till they are quite obliterated. Where the Tayle or hinder-fins are faſtened, the *vertebræ* do proportionably leſſen and do grow broader and leſs round. The *vertebræ* are joyned together by the intervention of a bony Cartilaginous body that conſiſts of a double *Lamina*, containing, in a Cavity in the Middle, a gellied ſubſtance. This is an excellent contrivance for the flection of the body, for otherwiſe the *vertebræ* themſelves are too rigid for ſuch a motion.

* *Fig.* x. P P.

I have before mentioned that there were thirteen † *Ribs*, that only five were faſtened to the *Sternum*, that the ſixth and ſeventh had Cartilages but not continued to the *ſternum*; how that they roſe obliquely from the Spine, *&c.* I ſhall add that the firſt five Ribs, that were continued to the Spine, had a double origination; the firſt to the extremity of the tranſverſe proceſs of a hinder *vertebra*, and the ſecond to the baſis of a former. The other Ribs were only faſtened to the extream of the tranſverſe or Lateral Proceſſes. The thirteenth or laſt Rib did ariſe only with a Cartilaginous Origination, and afterwards became long. And whereas the *os Pectoris* or *Sternum*, and that which continues the Ribs in other Animals to the *ſternum*, is uſually Cartilages, here 'twas all perfect bones.

† *S S S.*

The

‖ *Tab.* 1. *Fig.* 2. *d.* The ‖ *Sternum* here was one entire bone, four Inches and ½ long; about three and ½ broad at the upper end, but towards the lower part, it was but one Inch. It had no *Cartilago enſi-* or *ſcutiformis*, that I obſerved. At the broad end 'twas ſomewhat depreſſed, and in the middle had a perforation; both which I ſuppoſe were for the better adheſion of Muſcles. *Dan. Major* not taking notice of this, deſcribes part of the *os Hyoides* for the *os Sterni* as is mentioned before.

'Tis before remarked how much the *Fore-fins* reſembled an Arm, conſiſting of Bones and Cartilages curiouſly articulated together. The *Os* * *Humeri* or *Brachii* was about one Inch and ¾ long. The † *Radius* and ‖ *Ulna* about two Inches, but the *Radius* towards the Carpe was an Inch broad. The * *Carpus* ſeemed to conſiſt of five pretty large roundiſh bones, joyned by Cartilages, and two oblong ones that ſeemed the *Epiphyſes* of the *Radius* and *Ulna*. After this 'twas divided into five fingers, but the Thumb and little finger were very ſhort. The fore-finger was the longeſt, then the middle-finger, and ſo the third. Theſe three laſt mentioned fingers had the bones of the ‖ *Metacarpus*. The fore-finger had five † *Articuli* or Joynts, and ſo the middle finger; but the third had but three. Between the bones of each *Articulus* there were very large Cartilages that ſeemed double, one belonging to the extreams of each bone. *Major* hath given a figure of the whole Arm or Fin; (*n*) *Bartholine* hath a like picture of the hand of a Syren, and ſuch an one there is likewiſe in *Septalius* his *Muſæum*; as there is alſo kept in the Anatomy School at *Oxon.*

* *Tab.* 2. *Fig.* 11. *A.* † *B.* ‖ *C.* * *d d.* ‖ *e e e.* † *f f f.*

* *Tab.* 2. *Fig.* x. *Q.* The * *Scapula* to which was faſtened the *os Humeri*, was pretty large, much of the uſual figure of that of

(n) *Bartholin. Cent.* 2. *Hiſt. Anat.* 11.

Whales

Whales which is commonly made uſe of for Signs. It wanted the Spine and had two large ‖ proceſſes, ‖ *Fig. x. rr.* which is beſt underſtood by the Cut, as 'tis well repreſented by *Dan. Major*.

As to the *Myology* we have little to add, not having had leaſure to proſecute that in this ſubject; however I ſhall obſerve that the *Muſculus Pſoas* was very large, lying on each ſide the Spine, and having one extream inſerted in the *Thorax* and the other by ſtrong tendons in the Tayle. Likewiſe on the Back between the Spinal and tranſverſe Proceſſes there did lye two very thick Muſcles, riſing from the *os Occipitis* and terminating with a multitude of tendons in the Tayle, but ſending tendons all along to the Spinal *vertebræ*, &c. Theſe Muſcles doubtleſs contribute very much to their ſwift and nimble motion, which as it hath been obſerved by many, ſo is elegantly expreſſed by *Ovid*, where he ſaith,

Undiq; dant ſaltus, multâq; aſpergine rorant,
Emergúntq; iterum, redeúntq; ſub æquora rurſus,
Inq; Chori ludunt ſpeciem, laſcivâq; jactant
Corpora, & acceptum patulis mare naribus efflant.

FINIS.

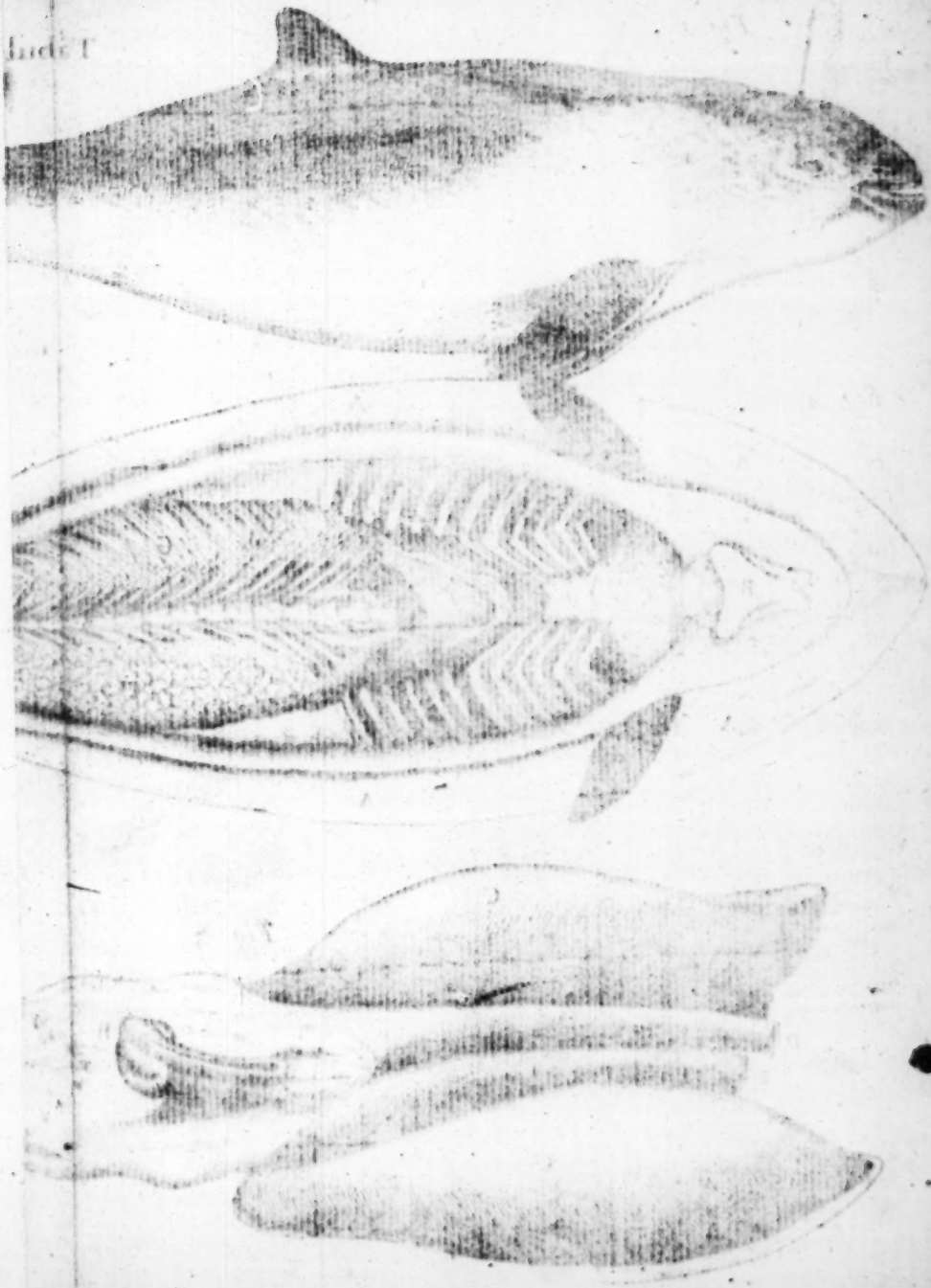
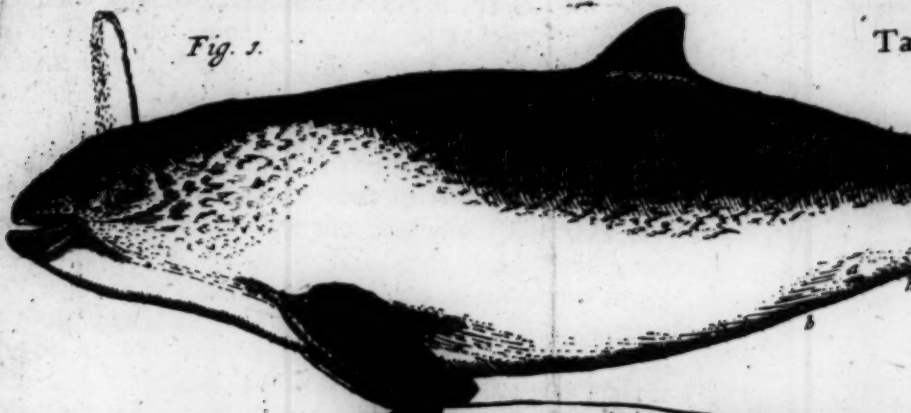


Fig. 1.



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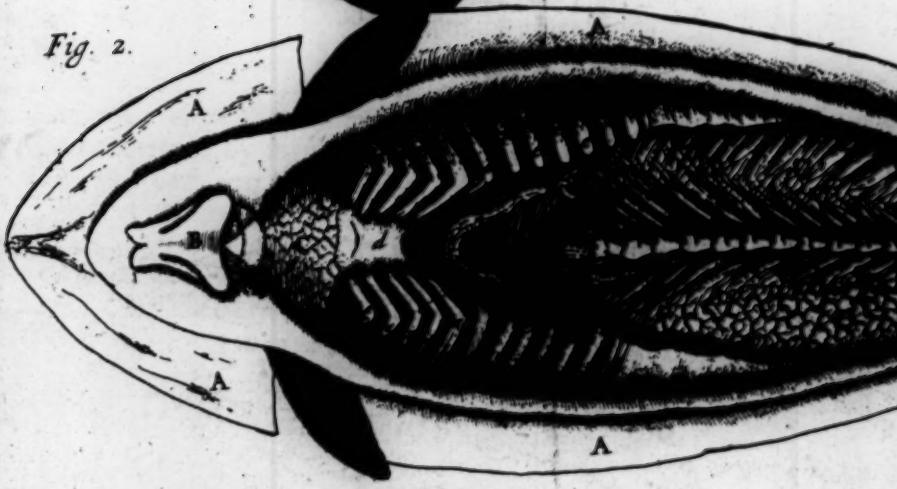

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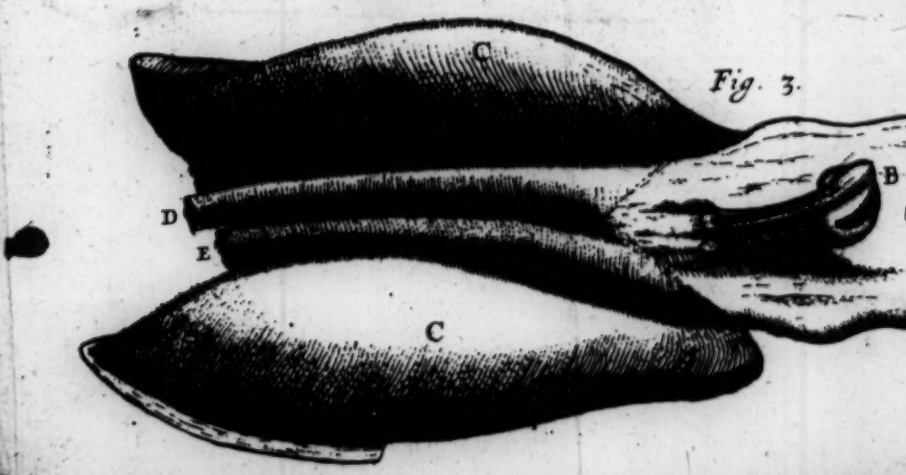


Tabula 3.ma

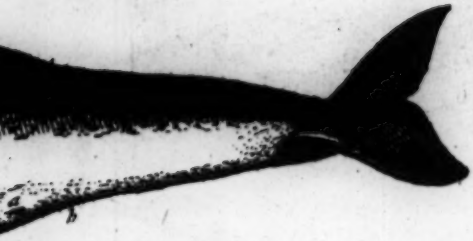
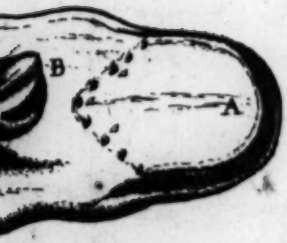
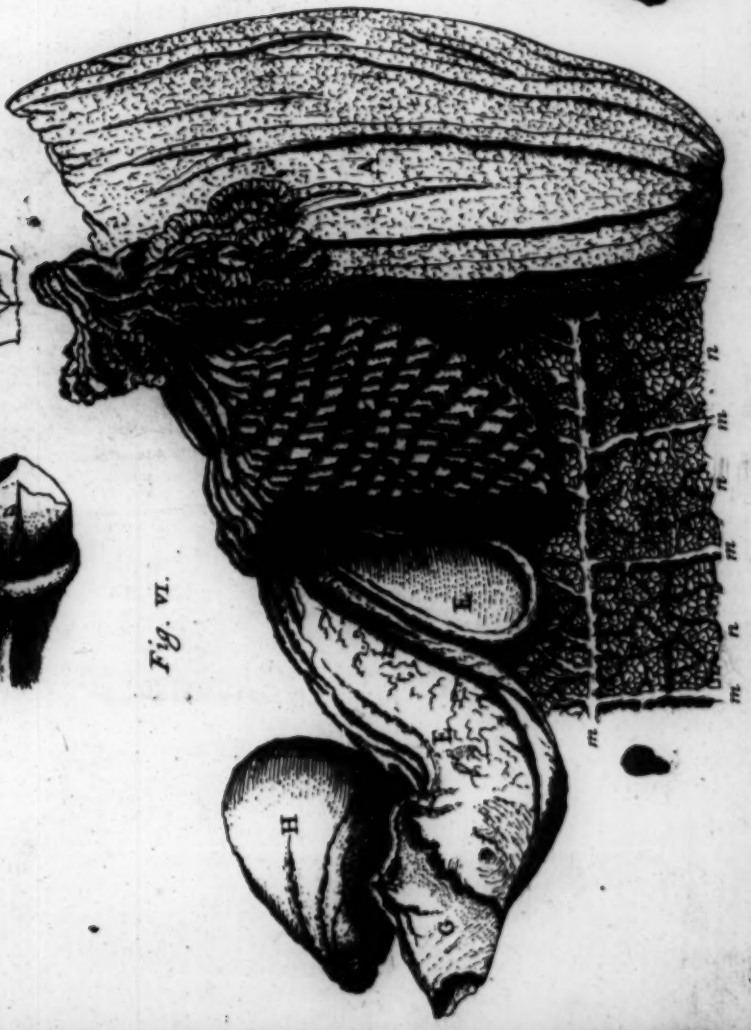


Fig. V.

Fig. 4.





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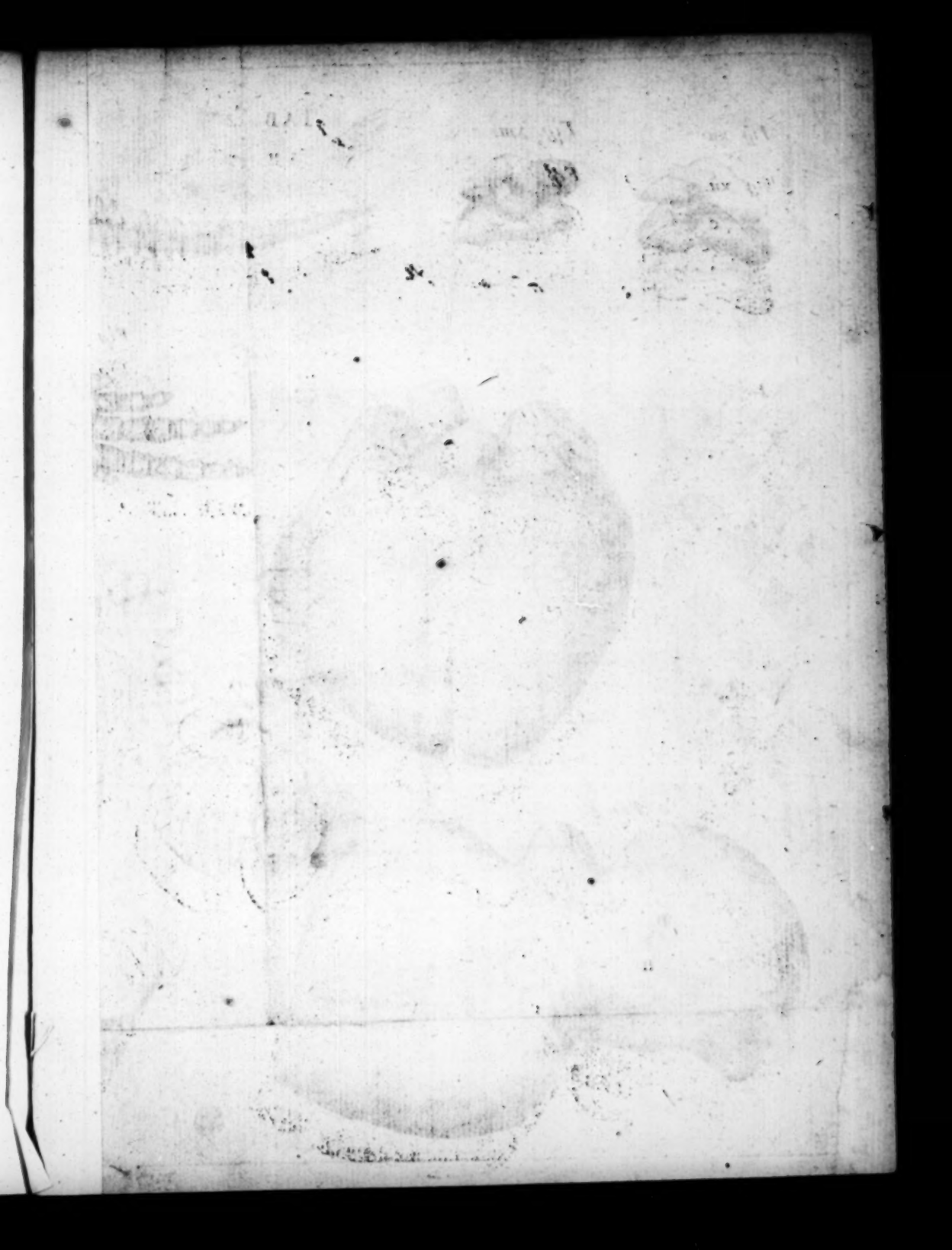

TAB. 2da

Fig. XII.

Fig. XIII.

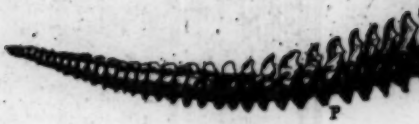

Fig. XI

Fig. I.

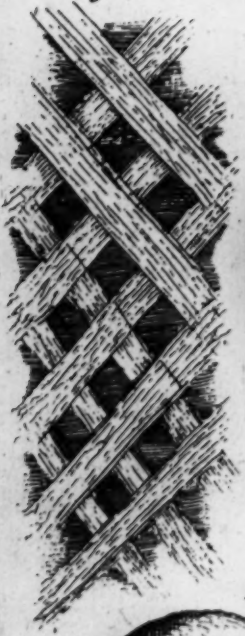

Fig. VI.

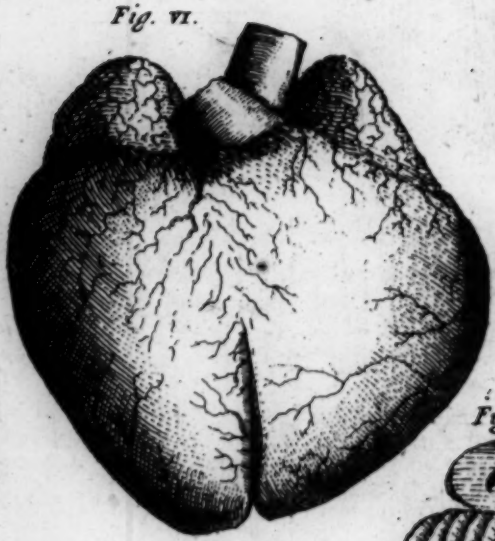

Fig. IX.

Fig. 2.

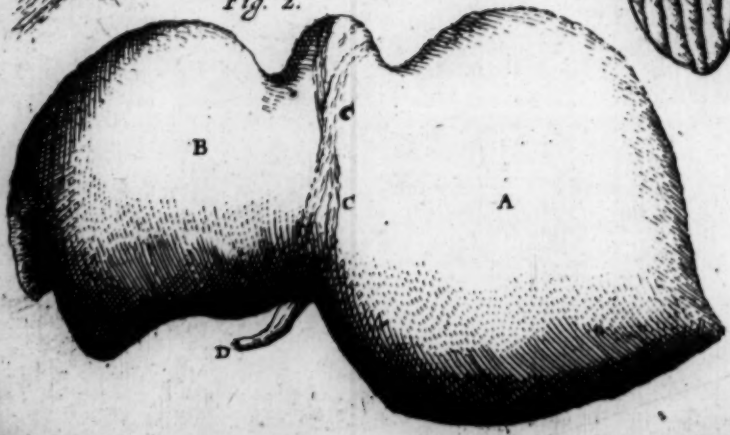

Fig. x.

Fig. xi.

Fig. v.

Fig. 3.

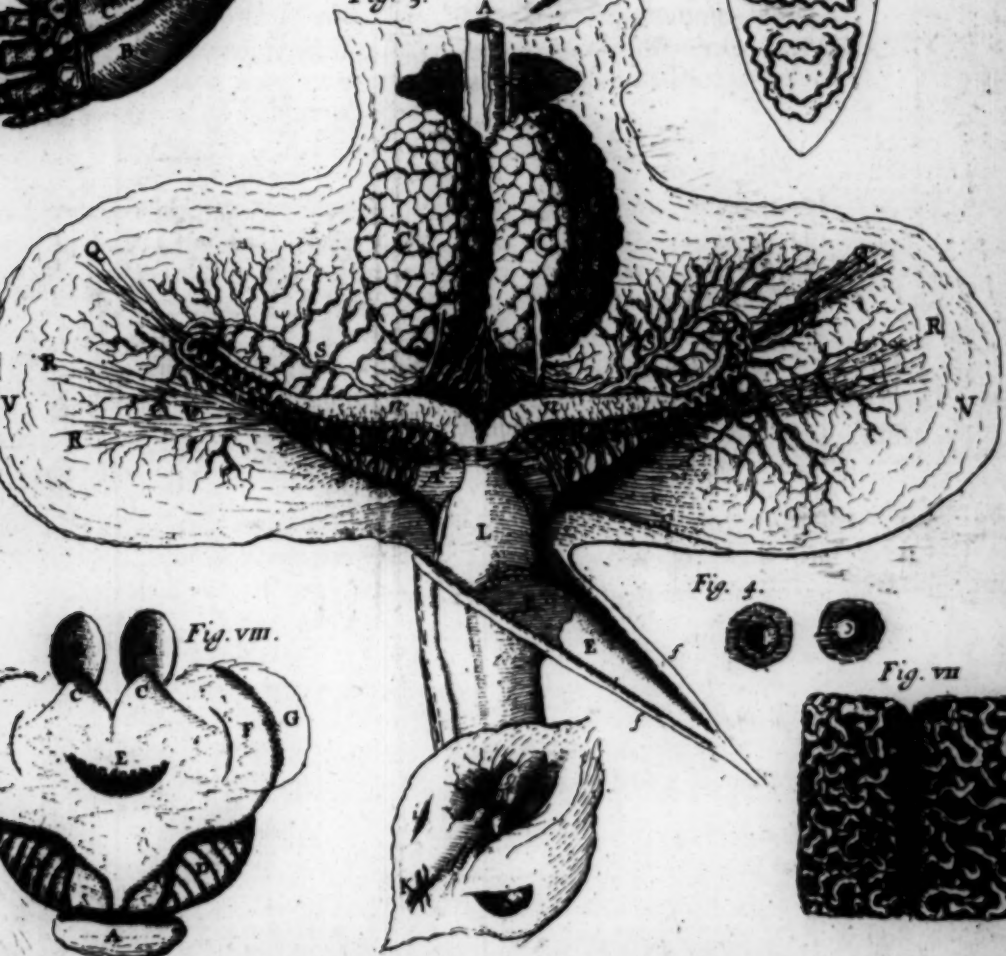

Fig. 4.

Fig. vii

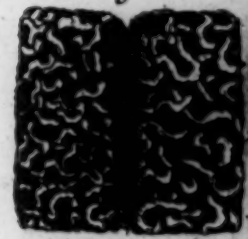

Fig. viii.

THE

Explication of the Figures.

Tabula 1.

Figura 1.

HEre *is given the lateral proſpect of this Fiſh, drawn from the life, and more exact than thoſe figures of* Bellonius, Rondeletius, Jonſton, Jo. Dan. Major, *or any I have yet ſeen. We may here obſerve the ſhape of the Body, its Color and Spottings, the ſite and proportion of its Fins and Tayle, the Eyes, the Mouth, the* Spiraculum *or Spout, and at* (a) *the* Rima *of the Teats and at* (bb) *that of the* Pudendum.

Fig. 2.

In the ſecond figure is repreſented the Fiſh opened, and the Viſcera *of the* Abdomen *taken out.*

AAAA. The Skin and Fat.

BB. The Os Hyoides *which is miſtaken by* Dan. Major *for the* Os Sterni.

C. The Thymus.

d. The Sternum.

eeee. The Ribs.

f. The Diaphragme.

G G. On the left ſide are repreſented ſeveral tendinous fibres of the Muſculus Pſoas, *and Diaphragme.*

H. On the right ſide are ſhewn the curious Anaſtomoſes *of bloud-veſſels of the Membrane inveſting the* Muſculus Pſoas.

Fig. 3.

In this figure is ſhewn the Tongue, the Larynx *and Lungs.*

A. The Tongue which is thick and ſerrated at the edges.

aa. Small Papillæ *or Eminences at the root of the Tongue.*

B. The Larynx *which is very protuberating.*

C C. The two Lobes of the Lungs.

D. The Gula *or* Oeſophagus.

E. The Great Arterie, or Arteria Aorta.

Fig. 4.

Repreſents the Mouth of the Larynx *opened.*

a. The Rimula.

Fig. 5.

This figure represents the Larynx *and its several Cartilages more distinct.*

A. The Cartilago Annularis *or* Cricoides.

B. The Cartilago Scutiformis *or* Thyroides.

C C. The Cartilago Arytainoides.

DDD. The Epiglottis.

Fig. 6.

In this figure the three Ventricles or Stomachs which are opened to shew their inward Tunicles, as also the Pancreas, *and part of the* Omentum, *are represented.*

A. The inside of the first Stomach.

B. Several large Rugæ *or* Plicæ *placed about the Passage from the first stomach to the second.*

C. The second stomach.

D. The Passage out of the second stomach into the third.

EE. The third stomach.

f. The Pylorus.

g. Part of the Duodenum.

H. The Pancreas.

i. The entrance of the Ductus Pancreaticus.

K. One of those Glandulous bodies which is supposed to be the Spleen.

L. Part of the Omentum *fastened to the stomach.*

m m m m. Large blood-vessels curiously ramified in the Omentum.

n n n. Curious small fibres filling up the Interstices of the blood-vessels, and rendring the whole structure of the Omentum *reticular.*

Tabula 2.

Fig. 1.

This figure does represent the several tendinous fibres of the Abdominal Muscles which running in various Manipuli, *and being curiously interwoven, do make the* Linea alba *which is here very broad.*

Fig. 2.

Here is shewn the figure of the Liver.

A. That part which was in the right Hypochonder.

B. That in the left.

CC. The Ligamentum Suspensorium.

d. The Vena Umbilicalis.

Fig. 3.

The Glandulæ Renales, *the Kidneys, Ureters and Bladder, and the various Organs of Generation*

ration belonging to the females, are delineated in this figure.

A. The vena Cava.

BB. The Glandulæ Renales, *or* Capsulæ Atrabilares.

CC. The two Kidneys, which consist of abundance of small Kidneys conglomerated together.

dd. The Ureters.

EE. The Bladder or Vesica Urinaria.

ff. The two Arteriæ Umbilicales.

G. *The* Pudendum.

h. The Clitoris *according to* Dan. Major.

ii. The two Teats.

K. The Anus.

L. The Uterus *or Womb.*

NN. The Cornua Uteri.

oo. The Tubi Fallopiani.

Pp. The Ovaria *or* Testiculi.

QQ. Muscular fibres that run to the Cornua Uteri.

SSS. Numerous Ramifications of blood-vessels that run to the Cornua Uteri, *the* Ovaria, *&c.*

TT. The Alæ Uteri.

VV. Part of the Peritonæum.

Fig. 4.

Represents a single Kidney or one of those Glands cut in two, one part hath a protuberance in the middle, the other a cavity or hollow.

Fig. 5.

Represents the inside of the Glandula Renalis, *cut horizontally.*

Fig. 6.

The figure of the Heart, almost in its natural bigness; wherein may be seen the division of the Cone, the Auricles, the Arteria Pulmonalis, Aorta, *&c.*

Fig. 7.

Is a delineation of part of those blood-vessels which compose that supposed Glandulous Body that lyes on each side the Spine in the Thorax *or Breast.*

Fig. 8.

Are represented various parts belonging to the Fistula *or Spout on the head.*

A. The slit in the Skin, or outward Orifice of the fistula, *which in its natural site was placed over*

BB. The foramina *of the* Nares.

CC. Two Valves or Protuberances of the skin which cover part of the foramina.

DD. The first pair of Bags.

E. The common passage into the first pair of bags.

FF. The second pair of bags.

GG. Two Glands contained within the second pair of bags.

Fig. 9.

Does only represent the figure of the Slit or Orifice of the fistula *or* spiraculum *in the Skin and the first pair of bags.*

A. The Slit or Orifice of the Spout or fistula.

BB. The first pair of bags.

Fig.

Fig. 10.

The Explication of the Skeleton.

A. The upper Maxilla *or* Roſtrum.

a a. The two holes of the fiſtula or Spout.

B. Several protuberances on the Os Frontis.

c c. Two pyramidal proceſſes of two bones that compoſe part of the Spiraculum *or Spout.*

d. One of the outward bones of the Roſtrum.

e. One of the inward bones of the Roſtrum.

f. The os Zygomaticum.

g. A large eminence in the Cranium *and the* ſutura Coronalis.

h. The ſutura Lambdoidea.

i. The Teeth.

K. The lower Jaw.

m. The tranſverſe proceſs of the firſt vertebra *of the neck call'd* Atlas.

n. The Spinal proceſs of the ſame Vertebra.

o o o. The Spinal proceſſes of the other Vertebræ.

p p. Proceſſes oppoſite to the Spinal proceſſes conſiſting of two ſmall bones, ariſing from the Cartilages that joyn the Vertebræ *together.*

Q. The Scapula. *The bones of the fin are repreſented in the next figure.*

r r. Two proceſſes of the ſcapula.

S S S. The Ribs.

T. The Sternum.

Fig. 11.

The Bones that compoſe the foreſin are here delineated.

A. The os Humeri.

B. The Radius.

C. The Ulna.

d d. The Bones of the Carpus.

e e e. The Bones of the Metacarpe.

f f f. The Bones of the Digiti.

Fig. 12.

Repreſents the Anterior part of the os Petroſum *or Ear-bone.*

a. The Hollow leading to the Tympanum.

B. The Tympanum.

C. That part of the Ear-bone that lyes in the Cranium.

D. That part which is without.

Fig. 13.

Repreſents the poſterior part of the os Petroſum *or Ear-bone which here ſeems to be two bones.*

a a. That part of the Ear-bone that repreſents a Cochlea.

B. A Cavity for receiving the Auditory Nerve.

C. A large Hollow that leads into the Cavity of the Ear and ſeems to render it two bones.

d d. That part of the Ear-bone which is very thick and ſolid.

FINIS.